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ATTACHMENT 1 [Construction Memorandum]

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Technical Memorandum  
Construction Restrictions  
For Navy Property

Naval Station Norfolk,  
Norfolk, Virginia



Prepared For  
**Department of the Navy**  
Atlantic Division  
Naval Facilities Engineering Command

Norfolk, Virginia

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Prepared by

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Environmental, Inc.

**CDM**  
Federal Programs Corp.

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**TECHNICAL MEMORANDUM**

**CONSTRUCTION RESTRICTIONS FOR NAVY PROPERTY**

**NAVAL STATION NORFOLK  
NORFOLK, VIRGINIA**

**CONTRACT TASK ORDER 0117**

**February 25, 2002**

*Prepared For:*

**DEPARTMENT OF THE NAVY  
ATLANTIC DIVISION  
NAVAL FACILITIES ENGINEERING COMMAND  
*Norfolk, Virginia***

*Under the:*

**LANTDIV CLEAN Program  
Contract N62470-95-D-6007**

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**LIST OF ACRYONYMS AND ABBREVIATIONS**

bgs	below ground surface
BTX	Benzene-Toluene-Xylene
CAL	Camp Allen Landfill
CASY	Camp Allen Salvage Yard
CATP	Camp Allen Treatment Plant
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COPC	Contaminants of Potential Concern
DPVE	Dual Phase Vapor Extraction
FFA	Federal Facilities Agreement
gpm	gallons per minute
HHRA	Human Health Risk Assessment
MCL	Maximum Contaminant Level
NPL	National Priorities List
OSHA	Occupational, Safety, and Health Administration
PAH	Polynuclear Aromatic Hydrocarbons
PCB	Polychlorinated Biphenyl
RCRA	Resource, Conservation, and Recovery Act
RI	Remedial Investigation
SARA	Superfund Amendments and Reauthorization Act
SVOC	Semivolatile Organic Compound
TEGD	Technical Enforcement Guidance
TCLP	Toxicity Characteristic Leachate Procedure
USEPA	United States Environmental Protection Agency
VIDEQ	Virginia Department of Environmental Quality
VDOT	Virginia Department of Transportation
VOC	Volatile Organic Compound

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**1.0 INTRODUCTION**

This document outlines the environmental conditions and construction restrictions for design and construction projects conducted at the Camp Allen Landfill (CAL) and Camp Allen Salvage Yard (CASY). A brief background of the sites is presented, including historic and planned land uses. Environmental conditions, as well as assumptions regarding contamination at the sites in general are additionally outlined. Construction restrictions and requirements are also provided related to worker safety and performance standards that a contractor will be required to address when encountering CAL and CASY soils, groundwater, and/or sediments.

The goal of this technical memorandum is to provide an outline of the potential risks and restrictions associated with any construction work that impacts the CAL and CASY. Specifically, this document intends to:

- Provide a description of the CAL and CASY and their historic uses
- Outline known contamination in soils, groundwater, and sediment at the sites
- Provide requirements related to worker safety and construction requirements

The Navy is providing this information to Virginia Department of Transportation (VDOT) and its contractors involved in the I-564 Intermodal Connector project, the relocation of the ballfields from Fleet Recreation Park to the CASY, and any associated construction activities occurring on or near the boundaries of the CAL and CASY. However, the worker safety and construction requirements presented in this technical memorandum apply to any construction activities that impact these sites. All activities at the CAL and CASY shall address the potential for contaminant risks to human health and the environment.

**2.0 SITE DESCRIPTION, BACKGROUND, AND HISTORY**

The areas known as CAL and CASY are located within the property boundary of the Naval Station Norfolk. They are located south of the Naval Station airfield and Interstate 564 in the area known as Camp Allen. CASY lies between Areas A and B of the CAL. Ingerson Street divides the sites. Figure 1 shows the CAL and CASY and surrounding areas.

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**2.1    Camp Allen Landfill**

During the early 1940s, landfilling operations commenced in the Camp Allen area. Disposal activities continued until about 1974 primarily in two areas, Area A and Area B. Area A of the CAL is a 45-acre site that was used for the disposal of wastes from the early 1940s to 1975. During this time, significant quantities of municipal, solid, and hazardous wastes were disposed including general refuse, demolition debris, sludges from metal plating processes, parts cleaning and paint stripping operations, overage chemicals, various chlorinated organic solvents, acids, caustics, paints and paint thinners, pesticides and asbestos.

In the mid-1940s, an incinerator was constructed in the southern portion of the Camp Allen area to burn combustible wastes. This incinerator operated until the mid-1960s. Materials too bulky for the incinerator were buried in Area A of the CAL. Area B, the eastern portion of the CAL, received wastes from a 1971 fire at the CASY. A wide portion of a drainage ditch located in the northeast portion of Area B, where water tends to pool, is referred to as the Pond Area. In May 1999, the U.S. Army Corps of Engineers inspected the site, and verified that the pond area is considered upland property, and therefore is not within the Army Corps jurisdiction as a wetland.

At present, the majority of the CAL is covered with soil and grass to minimize surface erosion. Area A incorporates the Navy Brig facility and a heliport built over a portion of the landfill during the mid-1970s. A residential area, Glenwood Park, is located to the west of the site, off of government property.

**2.2    Camp Allen Salvage Yard**

Historically, the CASY area was covered with strands of hardwoods and vast areas of tidal marsh. Development of the Naval Station has severely altered the original terrain. CASY has been an active salvage yard for over 50 years. Until 1995, the facility was dedicated to the salvaging and disposal of scrap materials generated by the U.S. Navy in the Tidewater area. Numerous pieces of spare military equipment, old vehicle parts, and discarded electronic equipment were stored at the site. Other materials stored or handled at the CASY included lubricating oil, organic solvents, paints and paint thinners, acids, caustics, and pesticides. In 1995, use of the facility for the handling of scrap material was discontinued. All of the site salvage and storage areas, structures, and buildings that were active during the salvaging process have been demolished and removed.

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Currently, CASY is an area of approximately 22 acres of level, barren ground with little vegetation, surrounded by chain-link and barbed-wire fencing.

### **3.0 REGULATORY BACKGROUND**

In 1997 Naval Station Norfolk was placed on USEPA's National Priorities List (NPL). The Navy and EPA then signed a Federal Facilities Agreement (FFA) in 1999 for Naval Station Norfolk. The FFA identified specific requirements that the Navy, USEPA, and Virginia Department of Environmental Quality (VDEQ) must follow in terms of managing Installation Restoration (IR) sites at the Naval Station. The CAL (Site 1) and the CASY (Site 22) were two of the ten IR sites which were identified in the FFA and are being administered through the Navy's IR program that follows the provisions and requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 as amended by the Superfund Amendments and Reauthorization Act (SARA) in 1989. Changes to a sites with a remedy in place (Site 1), as well as investigations and remedial action that occur at the Navy's IR sites that are still under investigation (such as Site 22) must comply wit the requirements of the FFA and any other Records of Decision or Decision Document.

### **4.0 SUMMARY OF ENVIRONMENTAL CONDITIONS**

Prior to Naval Station Norfolk's NPL listing in 1997, the Navy had completed or had started environmental investigations at the CAL and CASY. Based on the results of previous investigations, and findings from the Remedial Investigations (RI) performed from 1992 through 1996, contamination from prior disposal practices and operating procedures has impacted surface and subsurface soils, sediment, and shallow groundwater at the CAL and the CASY to various degrees. The primary constituents of concern at CAL are volatile organic compounds. Other organic and inorganic contaminants were detected; however, volatile organic compounds (VOCs) represent the majority of the contaminants of potential concern (COPCs). In general, the primary COPCs at CASY are several inorganic constituents (metals), and, to a lesser extent, semivolatile organic (SVOC) and pesticide/polychlorinated biphenyl (PCB) constituents.

Both the CAL and CASY RIs included Human Health Risk Assessments (HHRA), which considered exposure to the COPCs for several categories of potential users including future construction and utility workers. The CASY HHRA also considered exposure to Current Adult

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Workers at Area B. Based on the scenarios evaluated, the HHRA for the CAL indicated that there were no risks posed to future construction workers or current adult workers from either Area A or B exposures via ingestion or dermal contact with subsurface soils or the inhalation of fugitive dusts. Potential risks to adult workers and construction workers from CAL groundwater were not evaluated, however. Workers were evaluated for incidental ingestion and dermal exposures to surface and subsurface soils, groundwater, surface water, and sediments, as well as the inhalation of fugitive dusts emanating from surface and excavated subsurface soils as part of the CASY HHRA. The results indicated that surface soils, subsurface soils, and to a lesser extent groundwater, each posed a potential risk due to accidental ingestion (PCBs, antimony, arsenic, and iron) and dermal exposure (PCBs, cadmium, chromium, and iron). Based on these findings and to minimize the potential for exposure, the Navy is presenting contamination profiles and outlining construction provisions below.

A brief summary of the nature and extent of contamination follows which focuses on the primary COPCs associated with each medium and is not intended to address all results in detail. Figure 2 shows the soil and sediment sampling locations at the sites; the locations of test trenches at the CAL; the locations of "hot-spot" areas of contamination at the CASY; and the locations of groundwater monitoring wells. Detailed findings and data evaluation are presented in the RI Reports (Baker, 1994, 1995a, 1999). Appendix A and B present contaminant summary tables for each medium.

#### **4.1 Soils**

The primary contaminants of concern from CAL Areas A and B surface soils are the PCB Aroclor-1260, and inorganic metals (arsenic, barium, cadmium, chromium, copper, lead, manganese, thallium, and vanadium). Subsurface soils from both CAL areas also showed significant though sporadic contamination from VOCs, SVOCs, pesticides, and PCBs. Although detected concentrations exceeded background criteria at various locations, significant inorganic source areas were not identified. Appendices A-1 through A-3 present contaminant summary tables for CAL soils. Additionally, geophysical investigations performed at the CAL Area A in 1983 and 1992 indicated that the area contained numerous buried metallic objects including sheet metal, crane cable, and reinforcing bars in concrete in the subsurface soils (see Figure 3).

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Analytical sampling results at CASY indicated that surface and subsurface soil were nominally impacted by disposal activities. SVOCs, including polynuclear aromatic hydrocarbons (PAHs), pesticides, PCBs, and metals have all impacted the surface and subsurface soils to some extent. While most concentrations were below COPC screening values, PCB concentrations (Aroclor-1254 and 1260) exceeding COPC screening values were found in both surface and subsurface soils, primarily in the southern half of the site. Inorganic metal concentrations above COPC screening values were also found in surface and subsurface soils (principally antimony, arsenic, iron, and lead). Appendices B-1 and B-2 present contaminant summary tables for CASY soils.

Appendices B-3 and B-4 summarize data from five soil samples collected along the northern edge of the CASY in 2001 (see Figure 2). Based on current I-564 design drawings, this part of the CASY will be impacted by the new highway project.

#### 4.2 Sediments

Figure 2 also shows the locations of sediment samples collected at the CAL and CASY. Analytical results from CAL RI indicated that contaminants may be migrating with groundwater and could be discharged into the surface water via seeps along the ponded area of the landfill. Sediments in the drainage ditches surrounding Areas A and B were found to contain isolated, elevated levels of organic and inorganic constituents. Concentrations correlated well with levels detected in surface soils and may be a result of surface particulate runoff and particle deposition in the drainage ditches. Several of the metals detected (arsenic, cadmium, chromium, copper, lead, mercury, nickel, silver, and zinc) exceeded sediment quality criteria in isolated areas of the Area A and B drainage ditches. Analytical summaries of the sediment data are presented in Appendices A-4 and A-5.

Further sampling of sediments in the CAL Area B pond and in the stormwater drain crossing the CASY indicated isolated, sporadic areas of various, inorganic (principally arsenic) and pesticide/PCB constituent concentrations (dieldrin, Aroclor-1260) at levels above COPC screening values and sediment screening values. Appendix A-6 presents a summary of these data. Surface water samples collected concurrently indicated that inorganic (principally arsenic and magnesium) constituent concentrations exceeding Federal Water Quality Criteria and Virginia Water Quality standards. These samples were collected from the storm drains located in the northern part of the site.

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#### **4.3 Groundwater**

The Columbia Aquifer (water table) and, to some extent, the underlying Yorktown Aquifer, are the primary aquifer systems of concern at CAL and CASY. Shallow groundwater is present as an unconfined aquifer with a water level ranging from approximately four to six feet below ground surface. Groundwater moves across the site towards the northeast in general, usually flowing in relation to the drainage ditches bordering the northern and eastern portions of the site.

Figure 2 shows the locations of groundwater monitoring wells at the CAL and CASY. Analytical summaries of the groundwater monitoring data are presented in Appendix A-7. Samples from shallow groundwater wells (<25ft) from CAL Areas A and B have detected high levels of volatile contaminants including solvent-related compounds, vinyl chloride, ketone, and BTX (Benzene-Toluene-Xylene) compounds. SVOCs, pesticides, and PCBs were also detected irregularly. Samples from the Yorktown Aquifer (>60ft) also indicated sporadic contamination from VOCs, SVOCs, and pesticides. Total inorganic constituents detected in both aquifers in concentrations exceeding drinking water standards are believed to be associated with total suspended solids present in the wells and not representative of actual groundwater contamination.

Four shallow groundwater samples were collected from the CASY during the RI. Groundwater samples collected from four existing monitoring wells in CAL Area B, were also evaluated in the CASY RI. Neither pesticides nor PCBs were detected in the groundwater samples. At some locations, inorganic metals were detected in shallow groundwater at levels exceeding Maximum Contaminant Levels (MCLs), Virginia Groundwater Quality Standards, and Virginia Drinking Water Standards. Antimony, arsenic, lead, and iron were detected in concentrations exceeding MCLs or USEPA Region III tap water screening values. The deeper Yorktown aquifer was not characterized in the CASY RI.

#### **5.0 SUMMARY OF SITE RESTORATION ACTIVITIES**

Portions of these sites have undergone environmental restoration activities. In addition, the Navy has on-going and planned remedial activities for other portions of these sites. These environmental restoration activities are summarized below.

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**5.1 Camp Allen Landfill**

**Soil:** At this time, soil remedial actions are complete at the CAL. As discussed in the Final Decision Document for the CAL (Baker, 1995b), the combined remedial actions including Dual Phase Vacuum Extraction and implementation of institutional controls are protective and effectively address potential risks posed by Area A soils. In 1996, the Navy removed contaminated soil and debris from Area B of the site.

**Groundwater:** As a result of past Navy operations, groundwater (both the shallow, Columbia aquifer, and the deep Yorktown aquifer) under the CASY and the CAL is currently contaminated with VOCs. In 1997, the Navy started the operation of the Camp Allen Treatment Plant (CATP), a groundwater remediation system that collects, treats, and discharges groundwater to the drainage ditch that flows to Bousch Creek. The purpose of the CATP is to both contain the contaminated groundwater plume on government property, as well as to treat the contaminated groundwater to levels that meet Federal and/or State groundwater or surface water standards prior to discharge. Due to the elevated levels of naturally occurring metals with the groundwater, the CATP requires the removal of metals from the groundwater prior to discharge. The heavy dashed lines shown on Figures 4 and 5 indicate the shallow and deep areas of influence of the CATP. The CATP is designed for an average flow of 150 gallons per minute (gpm), with design flows from Area A of 3 gpm for each of the two shallow wells, and 35 gpm for each of the three deep wells. The design flows for Area B of 3 gpm for each of the seven shallow wells, and 3 gpm for each of the four deep wells. In addition to the CATP, the CAL also has a Dual Phase Vapor Extraction (DPVE) system that is designed to address the localized VOC contamination in the soil and groundwater, which is designed to operate at 30 gpm from extraction wells that are 25' deep.

**Sediments:** The Navy is considering the excavation and disposal of approximately 550 cubic yards of contaminated sediments from the CAL Area B pond area. Approximately 50 cubic yards of sediment from the storm drain that crosses the CASY would also be removed and disposed of off-site. Clean backfill would be placed in the pond area and a suitable inlet structure will be added to the existing storm sewer piping.

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5.2 Camp Allen Salvage Yard

In 1998, the Navy performed a non-time critical PCB removal action at the Camp Allen Salvage Yard. More than 4,100 tons of PCB-contaminated soils were removed from the southern portion of the site (Baker, 1998).

**Soil:** The Navy has completed the removal of 4,800 cubic yards of metals-contaminated "hot spot" soil and over 14,000 cubic yards of PCB and metal contaminated soils exceeding the site cleanup goals (See Table 1). The Navy additionally plans to install a one-foot soil cover over the entire 22-acre site. The cover will be comprised of a minimum of 12 inches of fill material underlying 4 inches of topsoil. As some contaminated soils will remain in place under the cover, excavated materials exceeding either the site cleanup goals or Virginia Solid Waste Management regulations cannot be reused as fill material.

**Table 1. CASY Soil Clean-up Goals**

Contaminant	Clean-Up Goal (ppm)	Justification
Total PCBs	Surface soils (0 to 3 foot depth): 2 ppm Subsurface soils (>3 foot to top of GW): 5 ppm	Risk-based
Antimony	41 ppm	Risk-based
Arsenic	28 ppm	Background value
Iron	31,100 ppm	Risk-based
Lead	400 ppm	EPA Residential Action Level

**Groundwater:** The Navy intends to utilize its ongoing remediation program using the existing CATP to address groundwater issues at the CASY. The treatment system is designed to contain the groundwater plume and reduce contaminants to levels that meet Federal and/or State groundwater or surface water standards. The Navy also plans to implement institutional controls and a groundwater monitoring program to restrict groundwater use and ensure that clean-up goals are being met. The institutional controls will be incorporated into the Base Master Plan or Land Use Control Implementation Plan to prohibit the installation of water supply wells for either potable or non-potable use within the site.

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## **6.0 FUTURE USE OF THE SITES**

The Navy has no plans for improvements or upgrades at the CAL. Because this site is part of the Naval Station's IR Program, there are limitations on the uses of the site.

Following the completion of soil remedial activities at the CASY, the Navy intends to use the majority of CASY as a recreational area. This plan includes the construction of soccer and ball fields to replace some of the facilities at the Fleet Recreation Park that will be impacted by the planned construction of the I-564 Intermodal Connector by VDOT (see Figure 2). The I-564 Connector may also impact the northern edge of the CASY, as well as the portions of the CAL.

## **7.0 CONSTRUCTION RESTRICTIONS**

As summarized in Section 4, environmental investigations have documented the general nature and extent of contamination at the CASY and CAL. Because the Navy is managing these sites as part of the IR Program for the Naval Station, subject to the requirements of the FFA, the Navy has placed restrictions on any construction activities. General construction restrictions for soils, groundwater, stormwater, and sediments are presented in this section.

### **7.1 Soils**

#### **Site Characterization**

The locations of soil sampling points from the environmental investigations at the CAL and CASY were presented in Figure 2. Analytical results of the sampling are presented in Appendices A and B. Many of these soil samples were collected from 0 to 4 feet below ground surface (bgs). Based on this information and the results of the geophysical investigation, construction activities that encroach on the CASY or CAL may encounter contaminated soil as well as material buried in the landfill including metal objects (see Figure 3).

#### **Construction Restrictions**

The Navy will require the following construction restrictions:

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- Areas should be characterized prior to construction activities to better define the exact nature of soil contamination and to determine how these soils can be safely excavated and managed in accordance with Virginia Solid Waste Management regulations, Virginia Hazardous Waste Management Regulations, and other ARARS (see Table 2).
- Standard ASTM methods or other state or EPA-approved methods (i.e. Virginia Solid Waste Management regulations, Superfund representative sampling guidance, RCRA Groundwater Monitoring Technical Enforcement Guidance (TEGD), SW-846, or TCLP analytical methods) with regard to environmental soil sampling, preservation, handling, and analysis procedures should be used for all characterization activities.
- A summary outlining all sampling and characterization activities shall be required in an approved Work Plan as described in Section 8.0.

**Table 2. Soil/Sediment Characterization Methods**

Analyte(s)	Analytical Method
<b>Characterization Methods</b>	
Total PCBs	8087
TAL Metals	6010B/7471A
<b>Disposal Testing Methods</b>	
TCLP	1311/8260B, 8270C, 8081A, 8151A, 6010B/7470A
Ignitability	1010, Modified 1010
Reactive Cyanide/Sulfide	SW-846 Section 7
Corrosivity	9040, 9045
Volatiles (BTEX) <sup>1</sup>	8260B
TPH GRO/DRO <sup>2</sup>	8015B Modified
TOX <sup>3</sup>	9020B

<sup>1</sup>Benzene, Toluene, Ethylbenzene, Xylenes

<sup>2</sup>Gasoline, Diesel and Lubricant Range Total Petroleum Hydrocarbons

<sup>3</sup>Total Organic Halides

**Worker Safety**

Worker safety must additionally be considered in relation to potentially contaminated soils. Any work that is required where contact with soil is anticipated within the limits of the CAL and the CASY shall be supervised on site at all time by a person 29 CFR 1910.120 HAZWOPER certified as a site manager (i.e., 40 hours off site, 24 hours on site, and 8 hours of additional specialized training). All site workers that will come in contact with soil at the CAL & the CASY shall be 29 CFR 1910.120 HAZWOPER certified as a site worker.

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### **7.2 Sediments**

The locations of sediment sampling points from the environmental investigations at the CAL and CASY were presented in Figure 2. Sediment samples were typically collected to a depth of 8 inches below ground surface (bgs). Therefore, the Navy requires that any construction activities impacting these areas shall include a characterization of the sediments in accordance with Table 2 to define the exact nature of sediment contamination, and to determine how these sediments can be safely excavated and managed. It is VDOT's responsibility to determine the type and frequency of sampling required to be protective of human health and to determine proper disposal methods. All sampling and disposal activities must be in accordance with the appropriate regulatory requirements and the Navy's requirements. All activities are additionally subject to approval by the Navy, Virginia DEQ, and EPA via the review of site-specific work plans.

### **7.3 Groundwater and Storm Water**

#### **Site Characterization**

The locations of groundwater sampling points from the environmental investigations at the CAL and CASY were presented in Figure 2. The area influenced by the CATP was presented in Figures 4 and 5. In addition, estimated 10 ppb contaminant contour maps are provided in Figures 6 and 7. Contractors should be aware of the potential for movement of the contaminated groundwater plume as a result of dewatering processes performed during construction. In addition, as mentioned above, the shallow water table can be encountered at depths of 4 to 6 ft bgs. Therefore, construction and excavation activities along the northern edge of CAL and CASY may encounter groundwater.

#### **Groundwater Modeling**

Since it is imperative that contaminated groundwater remain on government property, contractors dewatering operations in the area of the CAL and the CASY shall be monitored to ensure that the existing extraction well capture zones are not significantly altered. It is required that the contractor develop a Construction Plan as part of the overall Work Plan (see Section 8.0) and sequence his groundwater dewatering operations to minimize the amount of groundwater pumped. Modeling may be required during the construction designs to minimize withdrawal

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rates and to reduce the potential for pulling contaminated groundwater off the site into other areas. It is VDOT's responsibility to demonstrate no impact to the capture zones and/or the VOC plumes.

**Construction Restrictions**

The Navy will require the following construction restrictions and monitoring activities:

- Measurement of groundwater elevations from existing monitoring wells to demonstrate that cone of depression of any dewatering well system does not mobilize the VOC plumes outside the extraction well capture zones shown on Figures 4 and 5.
- Sampling and analysis of dewatering wells and the Navy's existing monitoring wells for VOCs, before and after dewatering, to demonstrate the VOC plumes did not expand from their original configuration. VDOT may be required to install new monitoring wells especially if dewatering activities occur in areas not currently captured by the Navy's existing monitoring well system.
- Sampling and analysis of the effluent of the dewatering wells for VOCs and metals to assess the most appropriate disposal methodology for the dewatering effluent.
- All groundwater shall be collected, containerized, sampled, and tested prior to off-site disposal if the contractor has to dewater any area that may impact the CATP GW Capture Zones or VOC plumes shown on Figures 4 - 7. The contractor shall test on a batch basis, for the following Contaminants of Potential Concern (COPCs):
  - VOCs, using EPA Target Compound List methods
  - Total metals, using EPA Target Analyte List Methods and EPA's TCLP hazardous waste parameters.
  - Percent solids, as there may be pretreatment requirements proceeding discharge.
- Groundwater shall be treated and disposed of at a regulated and approved disposal facility based on the analytical results. Any contaminant concentrations that exceed EPA's TCLP limits will be considered as a hazardous waste and shall be treated as such in accordance with VDEQ Hazardous Waste Regulations pertaining to collection and storage activities. Any discharged groundwater that is encountered or results from construction activities shall meet all discharge permitting requirements of VDEQ.

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- Contractors shall address the impacts from storm water runoff during construction activities. Contractors will be required to implement storm water management practices to minimize the impact of storm water on the CAL and CASY.

**Worker Safety**

As with soils, worker safety must additionally be considered in relation to potentially contaminated groundwater. Any work that is required to be performed by the contractor within the limits of the CAL and the CASY, where contact with groundwater is anticipated, shall be supervised on site at all time by a person 29 CFR 1910.120 HAZWOPER certified as a site manager (i.e., 40 hours off site, 24 hours on site, and 8 hours of additional specialized training). All site workers that will come in contact with groundwater at the CAL & the CASY shall be 29 CFR 1910.120 HAZWOPER certified as a site worker. In addition, VDOT and it's contractors will be required to address the potential need for air monitoring and will be required to determine the appropriate level of protective equipment in areas where groundwater contaminant levels exceed VDEQ screening levels and construction worker's breathing zones are within a hole or a trench.

Prior to performing any work that will include contact with groundwater in the CATP capture zone, the contractor shall develop a Health and Safety Plan. This plan shall be reviewed and approved by an industrial hygienist, prior to submittal to the Navy for approval. It is the Navy's intent that EPA and VDEQ shall review this plan to ensure that worker safety and health is addressed. The contractor shall assume that the government will require a minimum of 60 days to review and supply comments. Government approval is required prior to starting any work on site where contaminated groundwater will be encountered.

**8.0 PERFORMANCE SPECIFICATIONS OR WORK PLANS**

Based on the nature and extent of contamination at the CAL and CASY, and because these sites are being managed by the Navy as part of the IR Program for the Naval Station, subject to the requirements of a FFA, the Navy will require contractors to provide detailed performance specifications or work plans describing the approach and methodology for managing soils and groundwater during construction activities that impact the CAL and CASY. These plans should be prepared in advance and should be incorporated into standard procedures related to excavation,

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dewatering, and all other practices not specifically outlined in this document. Of immediate concern should be the need for ensuring worker safety.

These performance specifications or work plans should include or require, at a minimum:

**Health and Safety Plan:** A site-specific Health and Safety Plan will be required in advance addressing OSHA requirements (29 CFR 1910.120) for individuals working with hazardous waste. The plan should describe safety precautions for each phase of the project as specifically related to excavation and dewatering. The plan should additionally identify safety equipment and procedures to be available and used during the project. It should also furnish the name and qualifications based on education, training, and work experience of the proposed Site Health and Safety Officers.

**Excavation and Material Handling Plan:** A material handling plan should be prepared prior to initiation of the work that includes a detailed explanation of the phases dealing with all soils, groundwater, and sediments, including the following: a schedule to be employed for the excavation, a sequence of operation, the method of dewatering (if necessary), excavation, hauling, proposed equipment, and handling of the contaminated materials, testing requirements, and safety precautions and requirements. The plan should also show proposed temporary storage structures and address the potential for solid waste permitting requirements.

**Field Sampling and Laboratory Testing Plan for Soils and Groundwater:** The plan should describe field sampling methods and quality control procedures. Confirmatory sampling and testing of soil used to determine suitability as clean fill shall be performed by a qualified laboratory and should be explained in detail. At a minimum, the source of any clean fill utilized shall be identified and all fill soils must meet the cleanup goals for the site-specific contaminants. Any on-site or off-site material exceeding the site cleanup goals or Virginia Solid Waste Management regulations shall not be used on-site as fill material (See Table 3).

**ORDER NO.: G25  
CONTRACT ID. NO.: C00061322C02**

**Table 3. Clean Fill Testing Requirements**

Analyte(s)	Analytical Method
Total PCBs	8082
Antimony, Arsenic, Iron, Lead	6010B/7471A
TCLP	1311/8260B, 8270C, 8081A, 8151A, 6010B/7470A
Ignitability	1010, Modified 1010
Reactive Cyanide/Sulfide	SW-846 Section 7
Corrosivity	9040, 9043
Volatiles (BTEX <sup>1</sup> )	8260B
TPH GRO/DRO <sup>2</sup>	8015B Modified
TOX <sup>3</sup>	9020B

<sup>1</sup> Benzene, Toluene, Ethylbenzene, Xylenes

<sup>2</sup> Gasoline, Diesel and Lubricant Range Total Petroleum Hydrocarbons

<sup>3</sup> Total Organic Halides

**ORDER NO.: G25  
CONTRACT ID. NO.: C00061322C02**

**9.0 REFERENCES**

Baker Environmental, Inc. (Baker). 1999. Draft Remedial Investigation/Risk Assessment Report for Camp Allen Salvage Yard, Norfolk Naval Base, Norfolk, VA. Contract Task Order 0353, Contract N62470-89-D-4814.

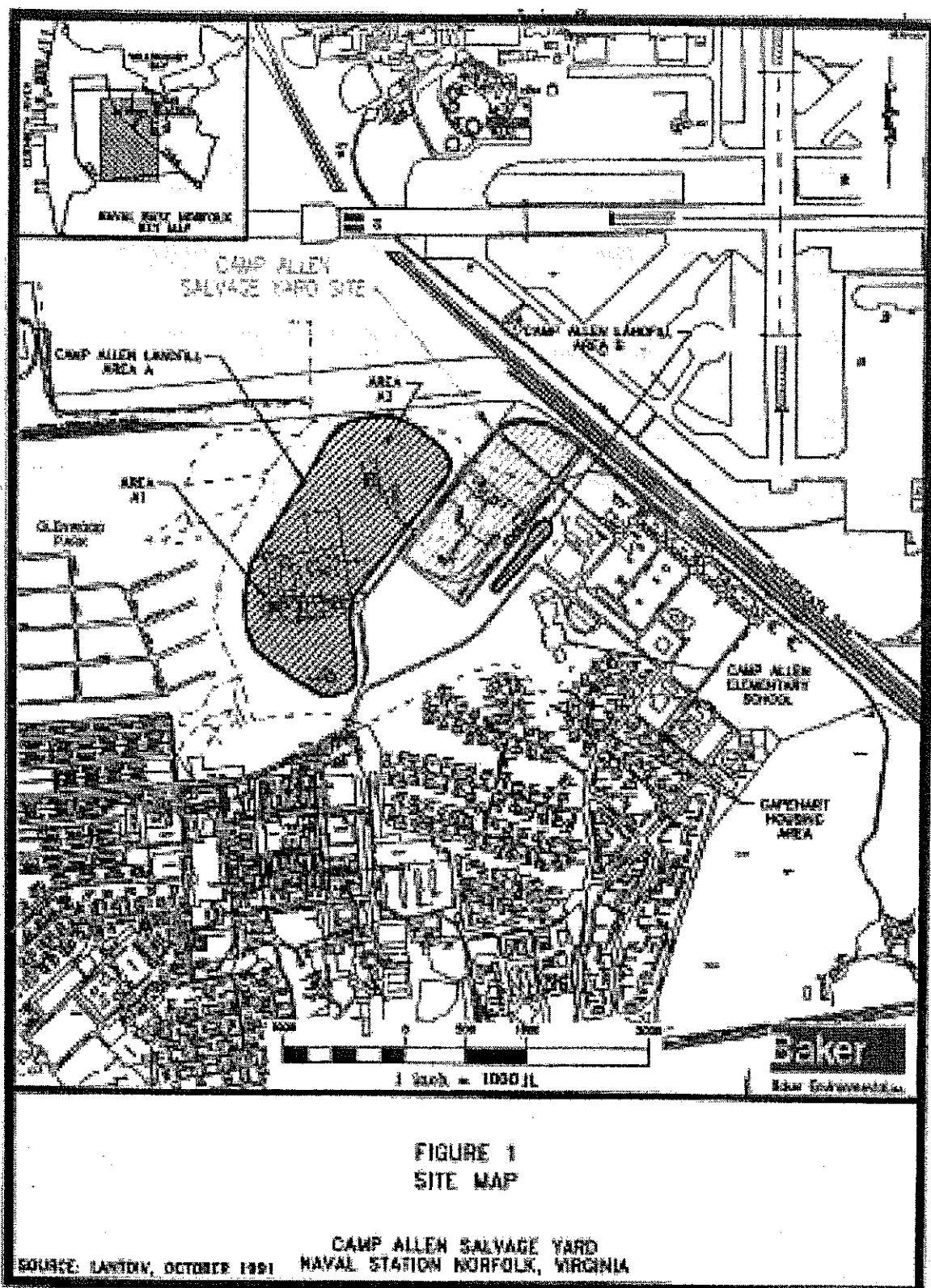
Baker Environmental, Inc. (Baker). 1998. Final Engineering Evaluation/ Cost Analysis (EE/CA), Camp Allen Salvage Yard, Norfolk Naval Base, Contract Task Order 0353, Contract N62470-89-D-4814.

Baker Environmental, Inc. (Baker). 1995a. Revised Final Baseline Risk Assessment, Camp Allen Landfill, Norfolk Naval Base, Norfolk, VA. Contract Task Order 0084, Contract N62470-89-D-4814.

Baker Environmental, Inc. (Baker). 1995b. Final Decision Document, Camp Allen Landfill, Naval Base Norfolk Virginia. Contract Task Order 0084, Contract N62470-89-D-4814.

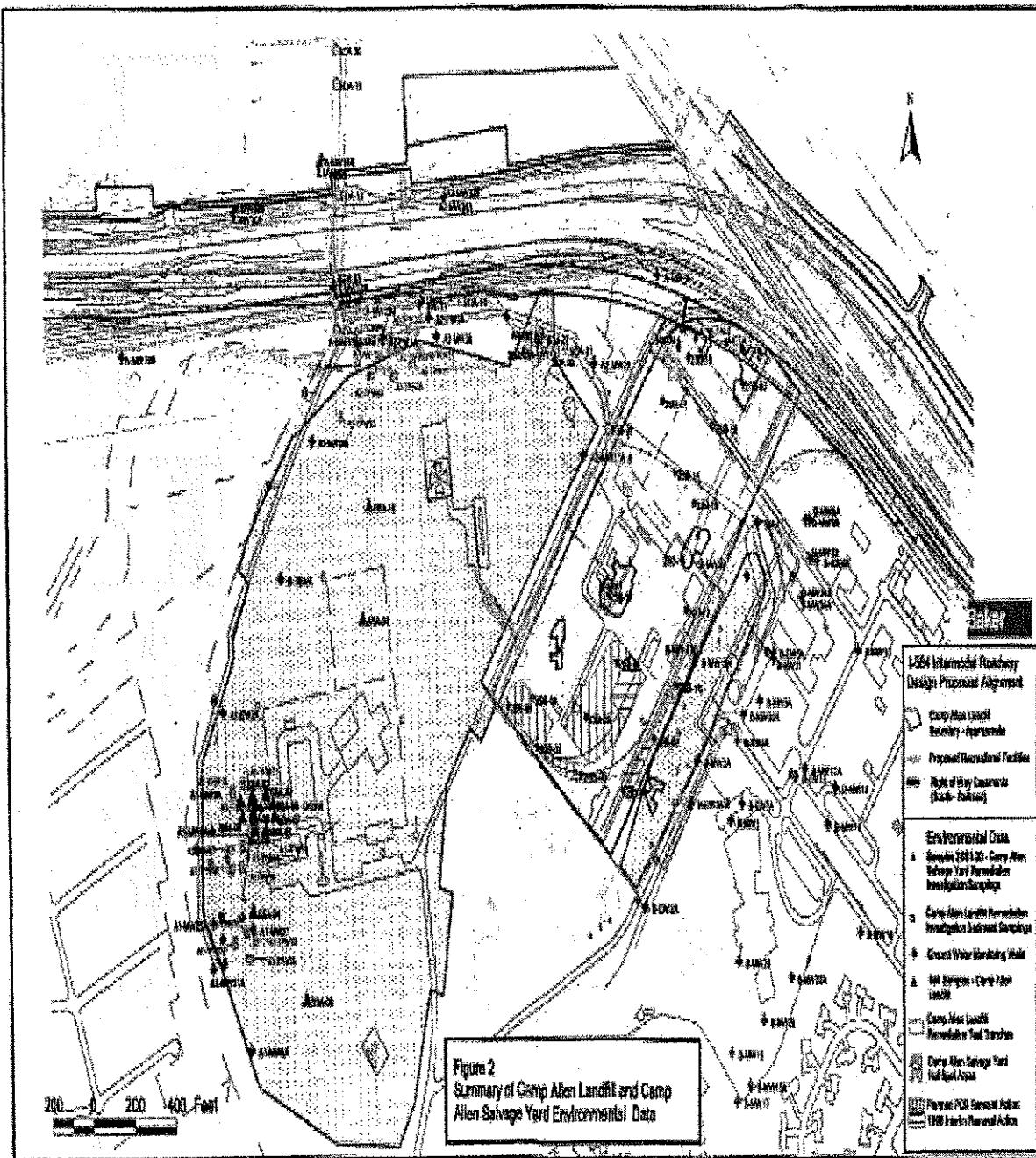
Baker Environmental, Inc. (Baker). 1994. Final Camp Allen Landfill RI Report, Norfolk Naval Base, Norfolk, VA. Contract Task Order 0084, Contract N62470-89-D-4814.

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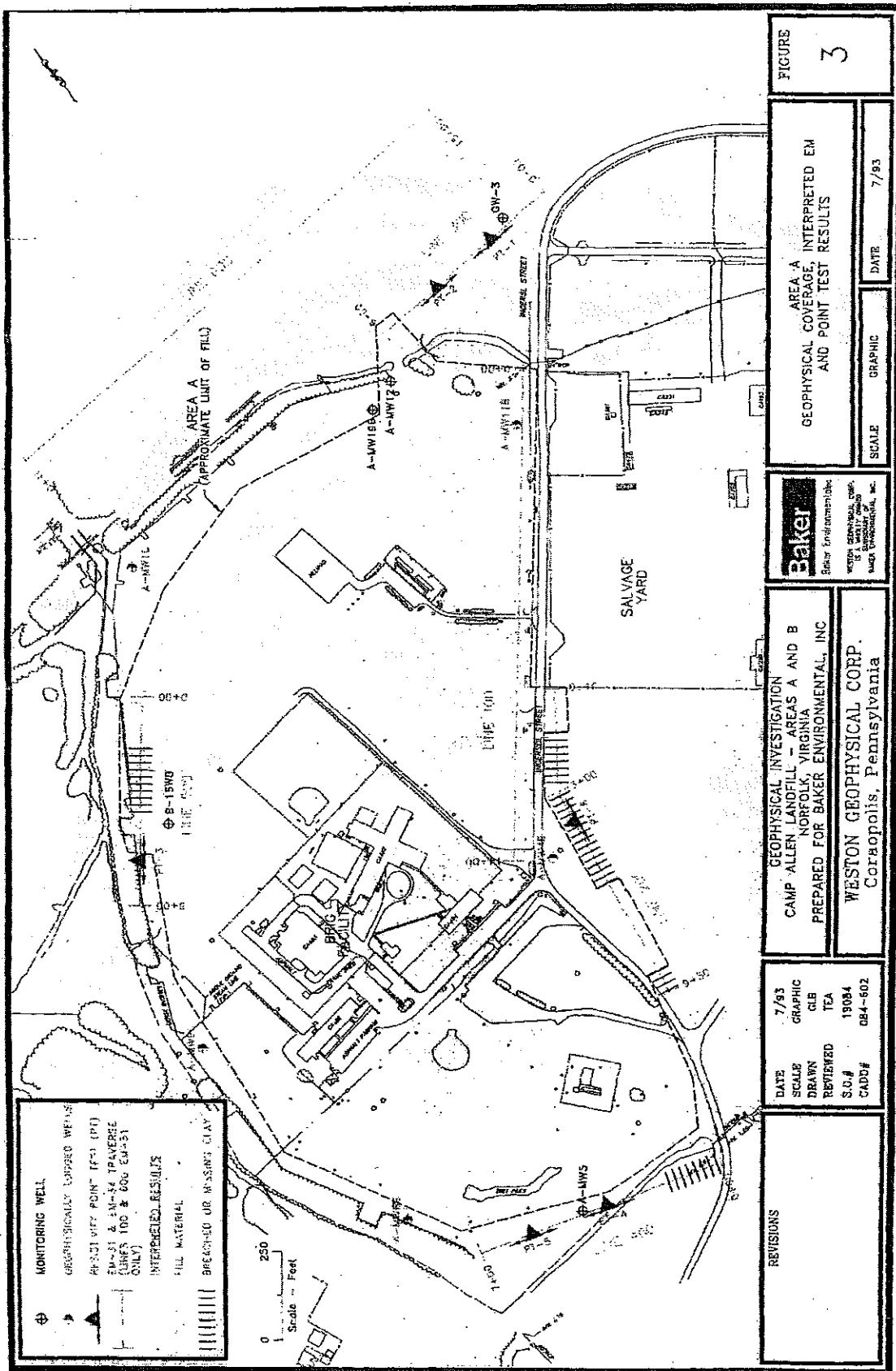


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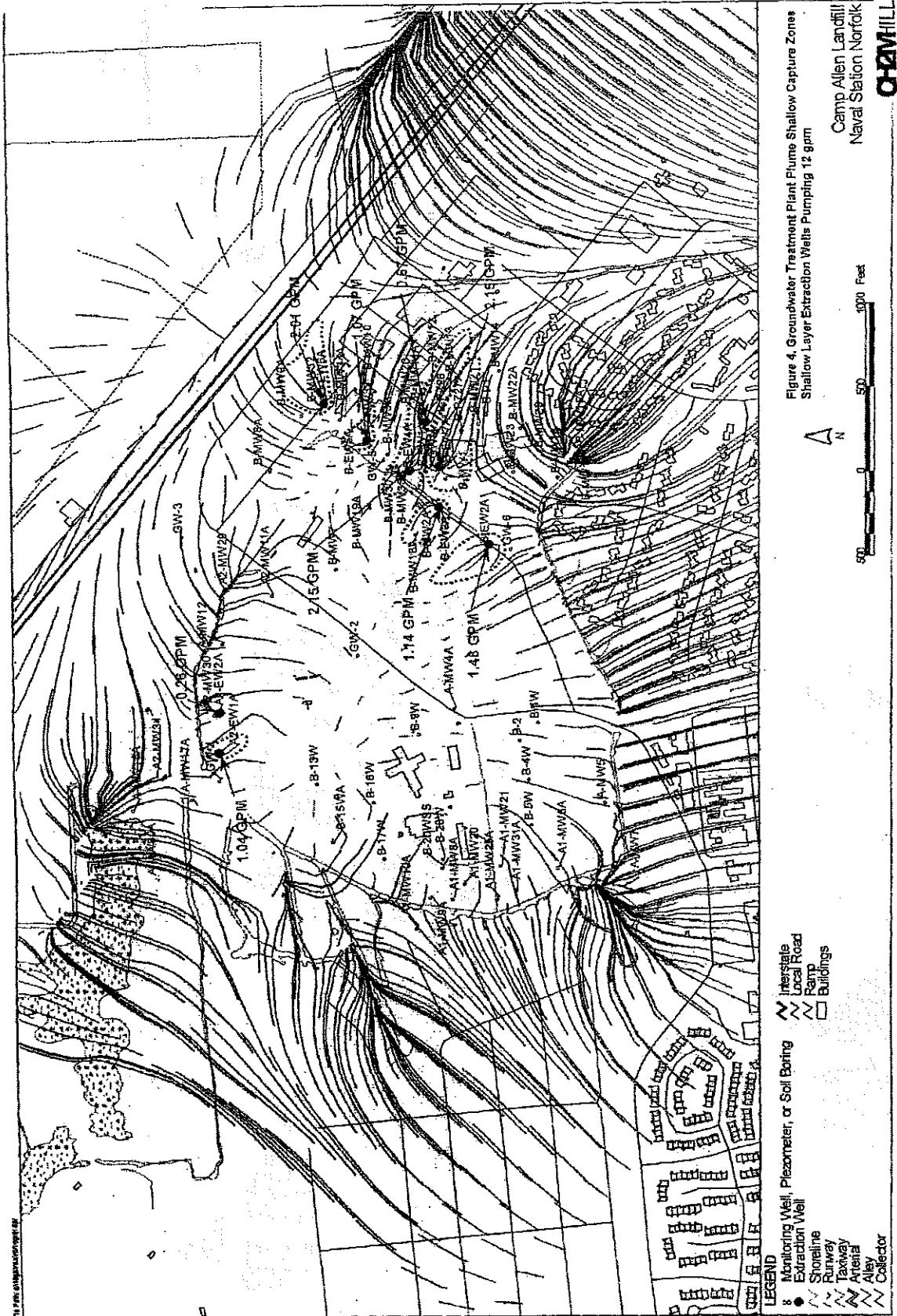
ORDER NO.: G25  
CONTRACT ID. NO.: C00061322C02



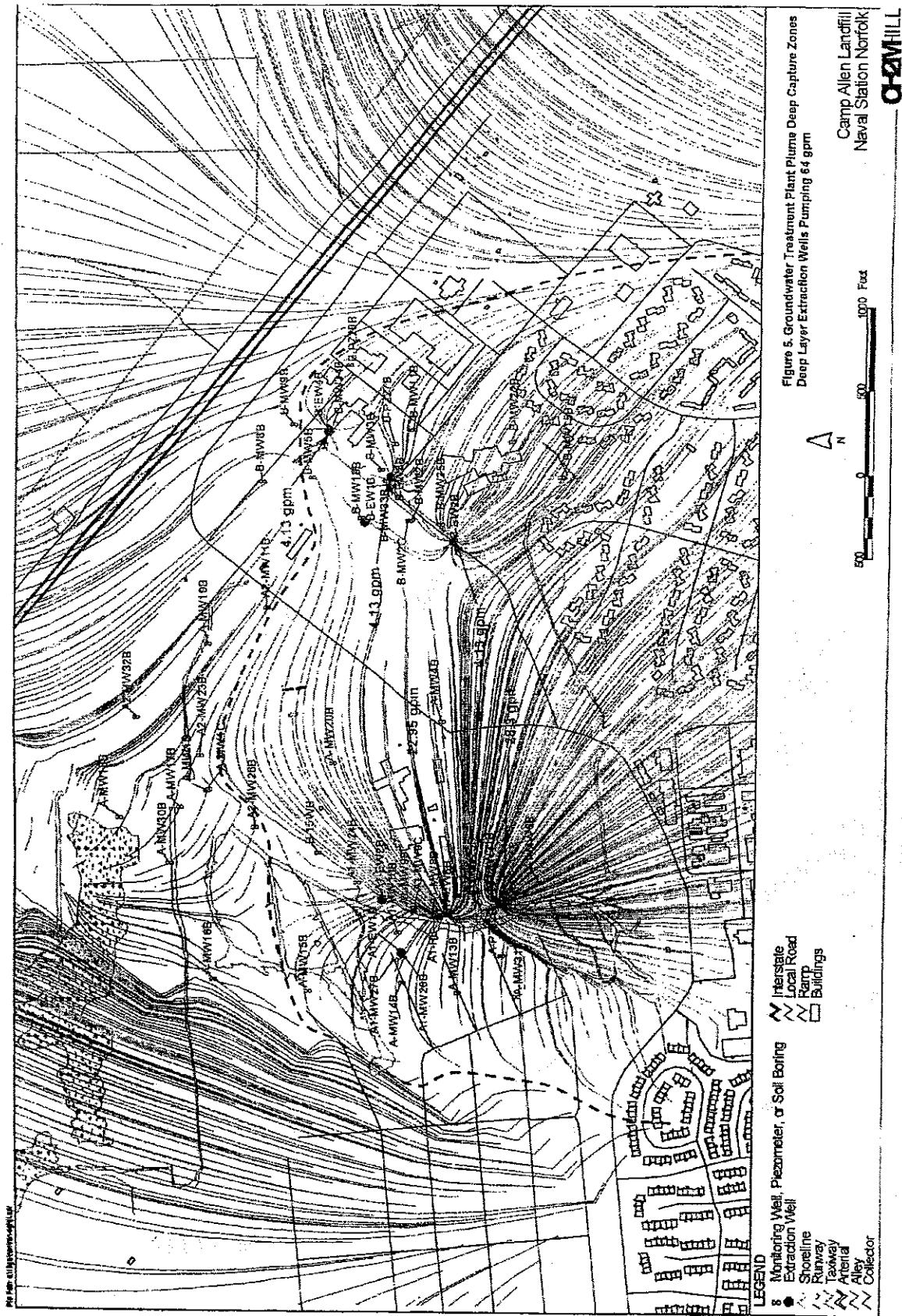
ORDER NO.: G25  
CONTRACT ID. NO.: C00061322C02



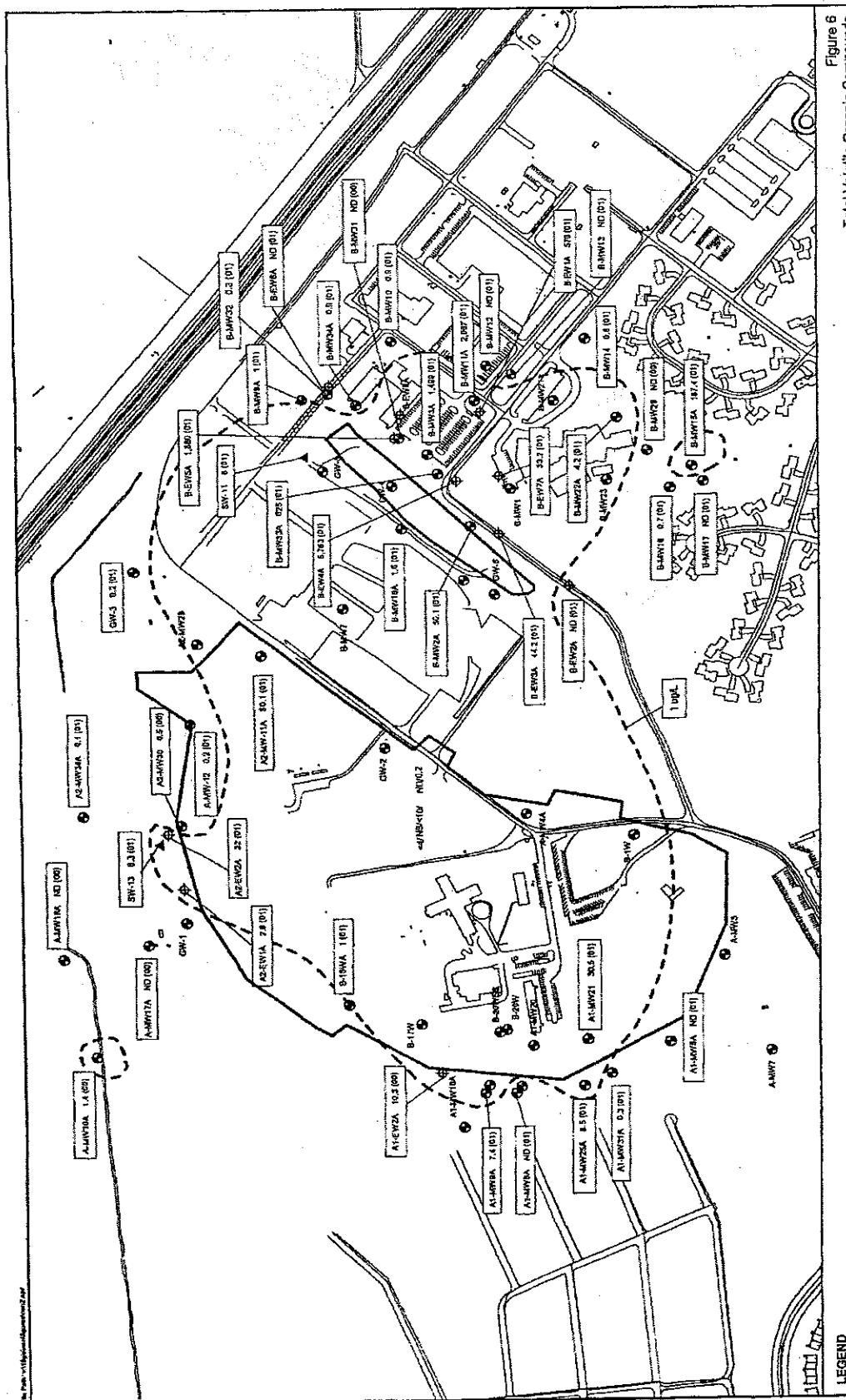
ORDER NO.: G25  
 CONTRACT ID. NO.: C00061322C02



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CONTRACT ID. NO.: C00061322C02



**ORDER NO.: G25  
CONTRACT ID. NO.: C00061322C02**



**CH2M**

Long-Term Monitoring Project  
Navajo Nation, Page 1

This figure is a map titled 'Total Volatile Organic Compounds Isoconcentration Plume Map'. It shows two monitoring wells, Areas A and B, located near Camp Allan Landfill. The map includes contour lines representing different concentrations of volatile organic compounds. The legend indicates that the plume is oriented towards the northwest.

VOCS = TOTAL VOLATILE ORGANIC COMPOUNDS  
SHADED AREA REPRESENTS ESTIMATED EXTENT OF VOC PLUME  
A1-MW25A B1 (01) = MONITORING WELL # / CONCENTRATION / YEAR OF LATEST DATA

**LEGEND**

- ▲ SURFACE WATER WELL LOCATION
- SHALLOW MONITORING WELL
- ◆ DEEP EXTRATION WELL
- ◆ ARE BOUNDARY LINE
- \*\*\* TOTAL VOC CONCENTRATIONS OF 1 UG/L  
NOTE: UNITS ARE MICROGRAMS PER LITER

**ORDER NO.: G25**  
**CONTRACT ID. NO.: C00061322C02**

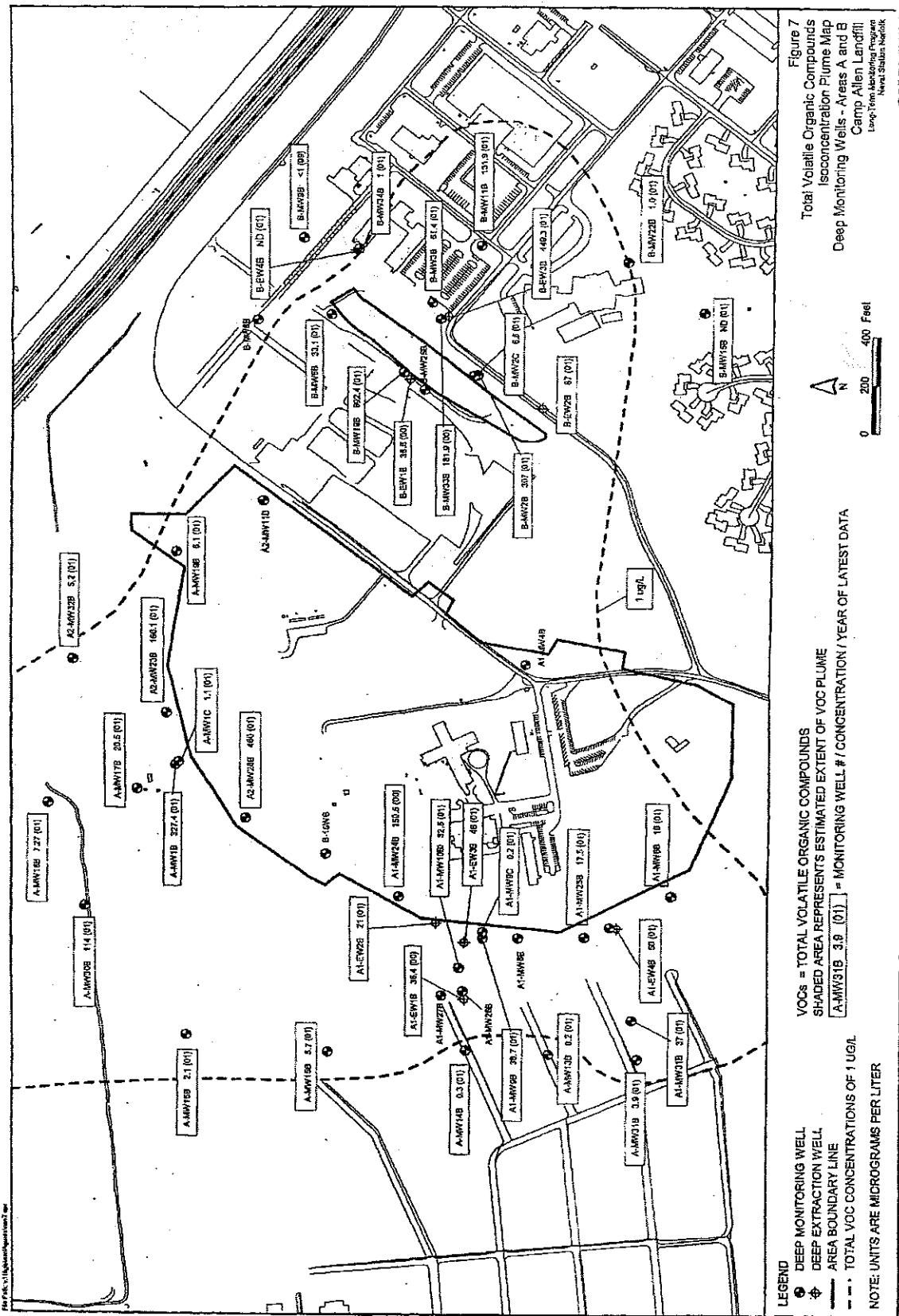


Figure 7  
 Total Volatile Organic Compounds  
 Isconcentration Plume Map  
 Deep Monitoring Wells - Areas A and B  
 Camp Allen Landfill  
 Long-Term Abating Program  
 Naval Station Norfolk

CH2MHILL

**ORDER NO.: G25**  
**CONTRACT ID. NO.: C00061322C02**

**APPENDIX A-1**

**SURFACE SOILS SUMMARY  
 CAMP ALLEN LANDFILL AREA A  
 NAVAL STATION NORFOLK, VIRGINIA**

Contaminant <sup>(1)</sup>	Soil Criteria <sup>(2)</sup>			Contaminant Frequency/Range <sup>(3)</sup>			Comparison to Criteria		
	Region III Industrial COC Value	Region III Residential COC Value	No. of Positive Detections/No. of Samples	Range of Positive Detections	Location of Maximum Detection	Above Industrial Value	Above Residential Value	Positive Detections	Positive Detections Above Residential Value
Benzo(a)anthracene	784	88	4/5	21 J - 69 J	SSA-03	0	0	0	0
Benzo(a)pyrene	784	9	4/5	19 J - 48 J	SSA-04	0	0	0	0
Benzo(b)fluoranthene <sup>(4)</sup>	784	88	4/5	27 J - 10 J	SSA-04	0	0	0	0
Benzo(k)fluoranthene	7,840	875	2/5	37 J - 51 J	SSA-04	0	0	0	0
Chrysene	78,400	8,750	4/5	20 - 76 J	SSA-03	0	0	0	0
Fluoranthene	8,176,000	312,857	5/5	23 J - 96 J	SSA-04	0	0	0	0
Indeno[1,2,3-cd]pyrene	784	88	1/5	25 J	SSA-04	0	0	0	0
Phenanthrene <sup>(4)</sup>	4,088,000	156,429	2/5	25 J - 36 J	SSA-04	0	0	0	0
Pyrene	6,132,000	234,643	5/5	29 J - 89 J	SSA-03	0	0	0	0
Pesticides/PCBs (ug/kg)						0	0	0	0
4,4'-DDD	2,385	266	3/5	4 J - 6.2 L	SSA-01	0	0	0	0
4,4'-DDB	1,683	188	5/5	0.5 J - 14	SSA-02	0	0	0	0
4,4'-DDT						0	0	0	0
Aldrin <sup>(5)</sup>						0	0	0	0
alpha-Chlordane <sup>(5)</sup>	1,635	183	5/5	0.46 J - 3.1 K	SSA-04	0	0	0	0
Aroclor-260						0	0	0	0
Dieldrin <sup>(5)</sup>						0	0	0	0
Endosulfan <sup>(5)</sup>	1,226,400	46,929	1/5	0.61 J	SSA-01	0	0	0	0
gamma-Chlordane <sup>(5)</sup>	1,635	183	2/5	1.4 J - 3.8 K	SSA-04	0	0	0	0
Hephaestus epoxide	63	7	2/5	0.69 J - 2.4 J	SSA-04	0	0	0	0

**ORDER NO.: G25**  
**CONTRACT ID. NO.: C00061322C02**

**APPENDIX A-1**

**SURFACE SOILS SUMMARY  
 CAMP ALLEN LANDFILL AREA A  
 NAVAL STATION NORFOLK, VIRGINIA**

Contaminant <sup>(1)</sup>	Soil Criteria <sup>(2)</sup>			Contaminant Frequency/Range <sup>(3)</sup>			Comparison to Criteria		
	Region III Industrial COC Value	Region III Residential COC Value	No. of Positive Detections/No. of Samples	Range of Positive Detections	Location of Maximum Detection	Positive Detections Above Industrial Value	Positive Detections Above Residential Value	Positive Detections Above Residential Value	
<b>Inorganics (mg/kg)</b>									
Aluminum	204,400	7,821	5/5	3640 - 9880	SSA-03	0	0	0	
Arsenic <sup>(4)</sup>	0,0400	0,049	5/5	1315 - 70	SSA-03	0	0	0	
Barium	14,308	15,48	5/5	33,271 - 10,50,1	SSA-03	0	0	0	
Cadmium <sup>(5)</sup>	102	4	3/5	22,214 - 86,9	SSA-03	0	0	0	
Calcium <sup>(6)</sup>	NE	NE	5/5	896 - 20,200	SSA-05	0	0	0	
Chromium <sup>(7)</sup>	613	24	5/5	8,9 - 121	SSA-03	0	0	0	
Cobalt	4,088	156	2/5	7,7 - 18,3	SSA-03	0	0	0	
Copper <sup>(8)</sup>	8,176	313	3/5	10,04 - 47,7	SSA-02	0	0	0	
Iron	6,320,5	2,346	5/5	4920 - 20,080	SSA-02	0	0	0	
Lead <sup>(9)</sup>	NE	400	5/5	3,2 - 683	SSA-05	0	0	0	
Manganese	4,088	156	5/5	39,5 - 128	SSA-03	0	0	0	
Mercury	NB	NE	3/5	0,29 - 0,77	SSA-04	0	0	0	
Nickel	4,088	156	4/5	7,1 - 84,1	SSA-03	0	0	0	
Thallium <sup>(10)</sup>	14	1	3/5	0,52 - 0,92	SSA-04	0	0	0	
Vanadium <sup>(11)</sup>	12,31	5,52	5/5	1,52 - 7,87	SSA-03	0	0	0	
Zinc	61,320	2,346	3/5	204 - 916	SSA-02	0	0	0	

**ORDER NO.: G25**  
**CONTRACT ID. NO.: C00061322C02**

**APPENDIX A-2**

**SUBSURFACE SOIL BORING SUMMARY  
 CAMP ALLEN LANDFILL AREA A  
 NAVAL STATION NORFOLK, VIRGINIA**

Contaminant <sup>(1)</sup>	Soil Criteria <sup>(2)</sup>			Contaminant Frequency/Range <sup>(3)</sup>			Comparison to Criteria		
	Region III Industrial COC Value	Region III Residential COC Value	No. of Positive Detections/No. of Samples	Range of Positive Detections	Location of Maximum Detection	Above Industrial Value	Above Residential Value	Positive Detects SBA	Positive Detects SBA-07DUP
<b>Volatiles (ug/kg)</b>									
1,1,1-Trichloroethane	57,232,000	2,190,000	1/10	63		SBA-06	0	0	0
1,2-Dichloroethene <sup>12</sup>	6,289	702	1/10	384 J		SBA-07DUP	0	0	0
1,1-Dichloroethene <sup>12</sup>	20,440,000	782,143	1/10	17		SBA-07DUP	0	0	0
2-Butanone	122,640,000	4,692,857	1/10	17000 J		SBA-08	0	0	0
Acetone	20,440,000	782,143	1/10	490 J		SBA-06	0	0	0
Carbon disulfide	20,440,000	782,143	3/10	4 J - 22		SBA-07DUP	0	0	0
Ethylbenzene	20,440,000	782,143	3/10	21 J - 45000 J		SBA-01	0	0	0
Methylene chloride	76,309	8,516	1/10	4 J		SBA-07DUP	0	0	0
Toluene	40,880,000	15,642,857	5/10	15 J - 3000000 J		SBA-01	0	0	0
Xylenes(total)	408,800,000	15,642,857	5/10	30 - 340000		SBA-01	0	0	0
<b>Semi-volatiles (ug/kg)</b>									
2-Methylnaphthalene	4,088,000	156,429	8/10	40 J - 21000		SBA-01	0	0	0
2-Methylphenol	10,220,000	391,071	3/10	151 J - 6400 J		SBA-03	0	0	0
2,4-Dimethylphenol	4,088,000	156,429	4/10	560 K - 41000		SBA-03	0	0	0
4-Methylphenol	1,022,000	39,107	2/10	161 J - 5500 J		SBA-03	0	0	0
Acenaphthene	12,264,000	469,286	5/10	53.5 J - 5600		SBA-01	0	0	0
Benzo(e)anthracene	784,000	145,151	2/10	145,151 J - 6500		SBA-07DUP	0	0	0
Benzo(a)pyrene	784,000	145,151	2/10	145,151 J - 6500		SBA-07DUP	0	0	0
Benzo(b)fluoranthene	784,000	145,151	2/10	145,151 J - 6500		SBA-07DUP	0	0	0
Benzo(b,h,i)perylene <sup>4</sup>	4,088,000	156,429	1/10	149.5 J		SBA-07DUP	0	0	0
Benzo(k)fluoranthene	7,840	875	1/10	155.5 J		SBA-07DUP	0	0	0

## APPENDIX A-2

**SUBSURFACE SOIL BORING SUMMARY  
CAMP ALLEN LANDFILL AREA A  
NAVAL STATION NORFOLK, VIRGINIA**

**ORDER NO.: G25  
CONTRACT ID. NO.: C00061322C02**

Contaminant <sup>(1)</sup>	Soil Criteria <sup>(2)</sup>			Contaminant Frequency/Range <sup>(3)</sup>			Comparison to Criteria		
	Region III Industrial COC Value	Region III Residential COC Value	No. of Positive Detects/No. of Samples	Range of Positive Detections	Location of Maximum Detection	Above Industrial Value	Positive Detects Above Residential Value	Positive Detects Above Industrial Value	
Semivolatiles (ug/kg)									
Bis(2-ethylhexyl)phthalate	40,880	4,562	5/10	95.5 J - 17000	SBA-06	0	0	0	0
Butylbenzylphthalate	40,880,000	1,564,286	1/10	25 J	SBA-10	0	0	0	0
Chrysene	78,400	8,750	3/10	26 I - 166 J	SBA-07/DUP	0	0	0	0
Dibenzofuran	817,600	31,286	3/10	30 J - 1700 J	SBA-01	0	0	0	0
Diethylphthalate	163,520,000	6,257,143	3/10	73 J - 195 J	SBA-07/DUP	0	0	0	0
Fluoranthene	8,176,000	312,837	3/10	34 J - 176.5 J	SBA-07/DUP	0	0	0	0
Fluorene	8,176,000	312,857	4/10	35 J - 1300 J	SBA-01	0	0	0	0
Indeno[1,2,3-f,g]pyrene	7,840	1,088	1/10	15 J	SBA-07/DUP	0	0	0	0
Isophorone	602,442	67,234	1/10	680 K	SBA-08	0	0	0	0
Naphthalene	4,088,000	156,429	6/10	34 J - 32000	SBA-01	0	0	0	0
Phenanthrene <sup>4</sup>	4,088,000	156,429	5/10	37 J - 370 J	SBA-06	0	0	0	0
Pyrene	6,132,000	234,643	3/10	31 J - 180 J	SBA-10	0	0	0	0
Pesticides/PCBs (ug/kg)									
4,4-DDD	2,385	266	8/10	0.88 J - 20 K	SBA-01	0	0	0	0
4,4'-DDE	1,683	188	6/10	2.5 K - 9.5 K	SBA-06	0	0	0	0
4,4'-DDT	1,683	188	1/10	11 K	SBA-05	0	0	0	0
alpha-Chlordane <sup>5</sup>	1,635	183	2/10	1.0 I - 2.6 L	SBA-10	0	0	0	0
Aroclor 1254	286	32	2/10	92 I - 1600	SBA-04	1	1	1	1
Aroclor 1260	286	32	5/10	49 I - 1800	SBA-06	1	1	1	1
delta-BHC <sup>13</sup>	35	4	1/10	1.4 K	SBA-08	0	0	0	0
Dieldrin	36	4	7/10	0.9 K - 89 K	SBA-04	3	3	3	3

**ORDER NO.: G25**  
**CONTRACT ID. NO.: C00061322C02**

**APPENDIX A-2**

**SUBSURFACE SOIL BORING SUMMARY**  
**CAMP ALLEN LANDFILL AREA A**  
**NAVAL STATION NORFOLK, VIRGINIA**

Contaminant <sup>(1)</sup>	Soil Criteria <sup>(2)</sup>			Contaminant Frequency/Range <sup>(3)</sup>			Comparison to Criteria		
	Region III Industrial COC Value	Region III Residential COC Value	No. of Positive Detections/No. of Samples	Range of Positive Detections	Location of Maximum Detection	Above Industrial Value	Positive Detections	Positive Above Residential Value	Above Residential Value
Pesticides/PCBs (ug/kg)									
Endosulfan II <sup>4</sup>	1,226,400	46,929	1/10		3.1 K		SBA-04	0	0
Endrin	61,320	2,346	1/10		2.7 J		SBA-10	0	0
Endrin aldehyde <sup>5</sup>	61,320	2,346	4/10		3.8 K-34 K		SBA-06	0	0
Hephaestus epoxide	127	14	1/10		2.7 K		SBA-08	0	0

## APPENDIX A-3

**TEST PIT SOIL DATA SUMMARY  
CAMP ALLEN LANDFILL AREA A  
NAVAL STATION NORFOLK, VIRGINIA**

**ORDER NO.: G25  
CONTRACT ID. NO.: C00061322C02**

Contaminant <sup>(1)</sup>	Soil Criteria <sup>(2)</sup>			Contaminant Frequency/Range <sup>(3)</sup>			Comparison to Criteria		
	Region III Industrial COC Value	Region III Residential COC Value	No. of Positive Detections/No. of Samples	Range of Positive Detections	Location of Maximum Detection	Positive Detects Above Industrial Value	Positive Detects Above Residential Value	Positive Detects Above Residential Value	
<b>Volatiles (ug/kg)</b>									
Acetone	20,440,000	782,143	9/30	38 - 850J	A1TPW1004 soil	0	0	0	
Benzene	10,406	1,161	1/30	25J - 25J	A2TPW0203	0	0	0	
2-Butanone	1,226,400,001	4,692,857	9/30	61 - 53J	A2TPW0902	0	0	0	
Carbon Disulfide	20,440,000	782,143	2/30	16J - 27	A2TPW0203	0	0	0	
Chloroform	NE	NB	2/30	61 - 12000	A1JPW0505 ash	NE	NE	NE	
Ethylbenzene	20,440,000	782,143	9/30	14J - 10000	A1TPW1105 ash	0	0	0	
1,2-Dichloroethane	6,289	702	1/30	6900 - 6900	A1TPW0505 ash	0	0	0	
1,2-Dichloroethylene (total)	183,9600	702	6/30	21 - 184,0000	A1TPW0604 soil/ash	0	0	0	
Methylene Chloride	76,309	8,516	7/30	21 - 46J	A1TPW0102RE ash/soil	0	0	0	
4-Methyl-2-Pentanone	16,352,000	62,5714	1/30	1100 - 1100	A1TPW0102RE ash/soil	0	0	0	
Styrene	40,880,000	1,564,286	1/30	2800 - 2800	A1TPW1105 ash	0	0	0	
Tetrachloroethene	1,006,400	1,228	4/30	570J - 5000J	A1TPW1004 soil	0	0	0	
Toluene	40,880,000	1,364,286	1/30	14J - 30J	A1TPW1004 soil/ash	0	0	0	
Trichloroethene	57,029,000	5,807J	6/30	63,35J - 10000J	A1TPW0604 soil/ash	0	0	0	
Vinyl Chloride	79,500	DNE	1/30	23 - 30000	A1TPW1004 soil	0	0	0	
Xylenes total	4,088,000,001	15,642,857	9/30	13 - 410000	A1TPW0604 soil/ash	0	0	0	
Total Unknown	NE	NE	28/30	10J - 486000J	A1TPW1014 soil, A1TPW0505 ash	NE	NE	NE	
Hydrocarbons									
Semivolatiles (ug/kg)									
Acenaphthene	12,264,000	469,286	9/26	32J - 1600J	A1TPW0805	0	0	0	

**ORDER NO.: G25**  
**CONTRACT ID. NO.: C00061322C02**

**APPENDIX A-3**

**TEST PIT SOIL DATA SUMMARY  
 CAMP ALLEN LANDFILL AREA A  
 NAVAL STATION NORFOLK, VIRGINIA**

Contaminant <sup>(1)</sup>	Soil Criteria <sup>(2)</sup>			Contaminant Frequency/Range <sup>(3)</sup>			Comparison to Criteria		
	Region III Industrial COC Value	Region III Residential COC Value	No. of Positive Detections/No. of Samples	Range of Positive Detections	Location of Maximum Detection	Above Industrial Value	Above Residential Value	Positive Detections	Positive Detections
Semi-volatiles (ng/kg)									
Anthracene	61,320,000	2,346,429	8/26	84J - 1100J	A2TPW0703	0	0	0	0
Benzo(a)anthracene	20,440,000	782,143	10/26	310J - 3500	A2TPW1102	0	0	0	0
Benzo(b)fluoranthene	7,840	875	10/26	140J - 1200J	A2TPW1102	0	0	0	0
Benzo(k)fluoranthene	7,840	875	10/26	110J - 1400J	A2TPW0902	0	0	0	0
Benzo(g,h,i)perylene <sup>14</sup>	6,132,000	234,643	10/26	100J - 2100J	A2TPW1102	0	0	0	0
Benzo(a)pyrene	78	9	10/26	200J - 2100J	A2TPW1102	0	0	0	0
Butyl benzyl phthalate	40,880,000	1,564,286	2/26	150J - 190J	A2TPW1102	0	0	0	0
Carbazole	28,616	3,194	5/26	59J - 150J	A2TPW0103D	0	0	0	0
Chrysene	78,400	8,750	11/26	56J - 2800	A2TPW1102	0	0	0	0
Dibenz(a,h)anthracene	78,400	8,750	7/26	32J - 340J	A2TPW0902	0	0	0	0
Dibenzo-furan	817,600	31,286	6/26	60J - 1300J	A1TPW0805	0	0	0	0
Di-n-butylphthalate	20,440,000	782,143	5/26	230JS - 40000J	A1TPW0604	0	0	0	0
1,2-Dichlorobenzene	18,396,000	703,929	1/26	79J - 79J	A2TPW103	0	0	0	0
1,4-Dichlorobenzene	23,847	2,661	10/26	20J - 1200J	A2TPW1203	0	0	0	0
Diethylphthalate	1,635,200,001	6,257,143	1/26	450J - 450J	A2TPW0502	0	0	0	0
2,4-Dimethyphenol	4,088,000	156,429	4/26	57J - 2600	A1TPW1105	0	0	0	0
bis(2-ethylhexyl)phthalate	40,880	4,562	16/26	48JB - 7500	A2TPW1203	0	0	0	0
Fluoranthene	8,176,000	312,857	11/26	37J - 6300J	A2TPW0703	0	0	0	0
Fluorene	8,176,000	312,857	11/26	30J - 1200J	A1TPW0805	0	0	0	0
Indeno(1,2,3-cd)pyrene <sup>14</sup>	784	88	10/26	100J - 2100J	A2TPW0902	0	0	0	0

## APPENDIX A-3

**TEST PIT SOIL DATA SUMMARY  
CAMP ALLEN LANDFILL AREA A  
NAVAL STATION NORFOLK, VIRGINIA**

Contaminant <sup>(1)</sup>	Soil Criteria <sup>(2)</sup>			Contaminant Frequency/Range <sup>(3)</sup>			Comparison to Criteria		
	Region III Industrial COC Value	Region III Residential COC Value	No. of Positive Detections/No. of Samples	Range of Positive Detections	Location of Maximum Detection	Above Industrial Value	Positive Detects Above Industrial Value	Above Residential Value	
<b>Semivolatiles (ug/kg)</b>									
2-Methanol <sup>15</sup>	1,022,000,001	3,910,714	2/26	1900D - 25000E	A1TPW1004	0	0	0	
4-Methanol <sup>15</sup>	1,022,000,001	3,910,714	4/26	1200D - 42000E	A1TPW1004	0	0	0	
4-Methylphenol	1,022,000	39,107	4/26	70J - 530J	A2TPW1203	0	0	0	
2-Methylnaphthalene	4,088,000	156,429	21/26	32J - 36000J	A1TPW0604	0	0	0	
Naphthalene	4,088,000	156,429	21/26	63J - 15000J	A1TPW0604	0	0	0	
3-Nitroaniline	NB	NB	1/26	23J - 23J	A1TPWQ905	NE	NE	NE	
Phenanthrene <sup>4</sup>	4,088,000	156,429	15/26	40J - 5400J	A2TPW0703	0	0	0	
Phenol	1,226,400,001	4,692,857	7/26	44J - 26000E	A1TPW1105	0	0	0	
Pyrene	6,132,000	234,643	12/26	40J - 5800J	A2TPW0703	0	0	0	

**ORDER NO.: G25**  
**CONTRACT ID. NO.: C00061322C02**

**APPENDIX A-4**

**SURFACE SEDIMENT DATA SUMMARY  
 CAMP ALLEN LANDFILL AREA A  
 NAVAL STATION NORFOLK, VIRGINIA**

Contaminant <sup>(1)</sup>	Sediment Criteria <sup>(2)</sup>			Contaminant Frequency/Range <sup>(3)</sup>			Comparison to Criteria		
	Region III Industrial Soil COC Value	Region III Residential Soil COC Value	No. of Positive Detections/No. of Samples	Range of Positive Detections	Location of Maximum Detection	Above Industrial Value	Positive Detections Above Residential Value	Above Industrial Value	Above Residential Value
<b>Inorganics (mg/kg)</b>									
Copper	NE	18/76	3/13	1/10	555 T	SWB-SDB-05S	0	0	1
Lead	NE	400	10/10	36.5/1000	SDA-01	NE	2	2	2
Mercury	NE	NE	10/10	0.2 - 1.6	SDA-02	NE	NE	NE	NE
Silver	1022	19	24/10	110	SDA-18S	0	0	0	1
Vanadium	1431	55	9/10	180	SDA-02V	0	0	0	1
Zinc	61,320	2,346	1/10	244 K	SWB-SDB-05S	0	0	0	0

## APPENDIX A-5

SUBSURFACE SEDIMENT DATA SUMMARY  
CAMP ALLEN LANDFILL AREA A  
NAVAL STATION NORFOLK, VIRGINIA

ORDER NO.: G25  
CONTRACT ID. NO.: C00061322C02

Contaminant <sup>(1)</sup>	Sediment Criteria <sup>(2)</sup>			Contaminant Frequency/Range <sup>(3)</sup>			Comparison to Criteria		
	Region III Industrial Soil COC Value	Region III Residential Soil COC Value	No. of Positive Detections/No. of Samples	Range of Positive Detections	Location of Maximum Detection	Positive Defects Above Industrial Value	Positive Defects Above Residential Value		
<b>Volatiles (ug/kg)</b>									
1,2-Dichloroethene <sup>(2)</sup>	1,839,600	70,393	1/1	26 J	SWB/SDB-0SD	0	0	0	0
2-Butanone	1,226,400,001	4,692,857	1/1	120	SWB/SDB-0SD	0	0	0	0
Acetone	20,440,000	782,143	1/1	520	SWB/SDB-0SD	0	0	0	0
Trichloroethylene	52,029	5,807	1/1	12 J	SWB/SDB-0SD	0	0	0	0
<b>Semi-volatiles (ug/kg)</b>									
Acenaphthene	12,264,000	460,286	1/1	4100	SWB/SDB-0SD	0	0	0	0
Benz(a)anthracene	784,000	843	1/1	250 J	SWB/SDB-0SD	0	0	0	0
Chrysene	78,400	8,750	1/1	460 J	SWB/SDB-0SD	0	0	0	0
Fluoranthene	8,176,000	312,857	1/1	1000	SWB/SDB-0SD	0	0	0	0
Pyrene	6,132,000	234,643	1/1	800 J	SWB/SDB-0SD	0	0	0	0
<b>Pesticides/PCBs (ug/kg)</b>									
4,4'-DDD	2,3,8,5	266	1/1	380	SWB/SDB-0SD	0	0	1	1
4,4'-DDE	1,683	188	1/1	85	SWB/SDB-0SD	0	0	0	0
Aroclor-1248	286	39	1/1	68	SWB/SDB-0SD	0	0	1	1
Aroclor-1254	286	32	1/1	980	SWB/SDB-0SD	0	0	1	1
Dieldrin	36	4	1/1	62	SWB/SDB-0SD	1	1	1	1
Endrin	61,320	2,346	1/1	11	SWB/SDB-0SD	0	0	0	0
<b>Inorganics (mg/kg)</b>									
Arsenic	0.382	0.043	2/0	188-50	SDA-18D	2	2	2	2
Cadmium	204	8	2/0	114-80	SDA-18D	0	0	0	0
Chromium	619	23	2/0	10-170	SDA-18D	1	1	1	1
Copper	1876	13	1/0	9330	SWB/SDB-0SD	1	1	1	1

**ORDER NO.: G25**  
**CONTRACT ID. NO.: C00061322C02**

**APPENDIX A-6**

**SUPPLEMENTAL SEDIMENT DATA AND SUMMARY**  
**CAMP ALLEN LANDFILL AREA B**  
**NAVAL STATION NORFOLK, VIRGINIA**

Contaminant <sup>(1)</sup>	Sediment Criteria <sup>(2)</sup>			Contaminant Frequency/Range <sup>(3)</sup>			Comparison to Criteria		
	Region III Industrial Soil COC Value	Region III Residential Soil COC Value	No. of Positive Detections/No. of Samples	Range of Positive Detections	Location of Maximum Detection	Above Industrial Value	Above Residential Value	Positive Detects Above Industrial Value	Positive Detects Above Residential Value
<b>Volatiles (µg/kg):</b>									
Acetone	20,440,000	782,143	2/8	73B - 730B	CASD-3	0	0	0	0
Methylene Chloride	76,309	8,516	4/8	10B - 26B	CASD-3	0	0	0	0
Carbon Disulfide	20,440,000	782,143	1/8	13J	2D3-3	0	0	0	0
2-Butanone	1,226,400,000	4,692,857	1/8	240	CASD-3	0	0	0	0
Trichloroethene	52,029	5,807	1/8	5J	CASD-1D	0	0	0	0
Toluene	40,880,000	1,564,286	1/8	3J	2DC-2	0	0	0	0
1,2-Dichloroethene (Total)	1,839,600	70,393	1/8	25J	CASD-1D	0	0	0	0
<b>Semi-volatiles (µg/kg):</b>									
N,N-Diisopropylbenzene	1,230,000	1,230,000	1/8	140J	CASD-1	0	0	0	0
2,4-Dinitrotoluene	408,800	15,643	1/8	130J	2DC-2	0	0	0	0
2-Methylnaphthalene	4,088,000	156,429	2/8	220J - 3,000J	CASD-3	0	0	0	0
Acenaphthene	12,264,000	469,286	2/8	300J - 880	2DC-2	0	0	0	0
Acenaphthylene	12,264,000	469,286	1/8	89J	2DC-2	0	0	0	0
Anthracene	61,320,000	2,346,429	2/8	130J - 1,400	2DC-2	0	0	0	0
Benz(a)anthracene	784,000	784,000	1/8	52J - 2,900	2DC-2	0	0	0	0
Benz(a)pyrene	1,784,000	178,400	1/8	80J - 2,100	2DC-2	0	0	0	0
Benz(Ob)fluoranthene	1,784,000	178,400	1/8	65J - 4,000J	2DC-2	0	0	0	0
Benz(e,h)perylene <sup>14</sup>	6,132,000	234,643	4/8	310J - 2,300	2 DC-2	0	0	0	0
Benz(k)Fluoranthene	1,784,000	178,400	1/8	30J - 1,600	2DC-2	0	0	0	0
Benzyl butyl phthalate	40,880,000	1,564,286	3/4	180J - 260J	CASD-1	0	0	0	0
Bis(2-ethylhexyl)phthalate	40,880	4,562	7/8	76J - 13,000	2 DC-2	0	0	0	0

**ORDER NO.: G25**  
**CONTRACT ID. NO.: C00061322C02**

APPENDIX A-6

**SUPPLEMENTAL SEDIMENT DATA AND SUMMARY  
 CAMP ALLEN LANDFILL AREA B  
 NAVAL STATION NORFOLK, VIRGINIA**

Contaminant <sup>(1)</sup>	Sediment Criteria <sup>(2)</sup>				Contaminant Frequency/Range <sup>(3)</sup>			Comparison to Criteria		
	Region III Industrial Soil COC Value	Region III Residential Soil COC Value	No. of Positive Detections/No. of Samples	Range of Positive Detections	Location of Maximum Detection	Industrial Value	Above Residential Value	Positive Detects Above Industrial Value	Positive Detects Above Residential Value	
<b>Pesticides (µg/kg):</b>										
Endrin Ketone <sup>17</sup>	61,320	2,346	1/8	54J	CASD-3	0	0	0	0	
gamma-BHC (Lindane)	440	49	1/8	260	2DG-2	0	0	0	0	
gamma-Chlordane <sup>5</sup>	1,635	183	1/8	83J	CASD-3	0	0	0	0	
PCBs (µg/kg):										
Aroclor-1260	286	32	5/8	190J - 6,100J	2DC2	3	5	3	3	
Inorganics (mg/kg):	0	0								
Aluminum	2,044,000	7,821	8/8	1330 - 18,500	CASD-3	0	0	0	0	
Antimony	821	3	9/8	3,113 - 22,214	CASD-3	0	0	0	0	
Arsenic	0.38	0.043	8/8	12JK - 98.9	CASD-3	0	0	0	0	
Barium	14,308	548	8/8	17.3 - 151	CASD-1	0	0	0	0	
Beryllium	409	16	8/8	0.18 - 1.7	CASD-3	0	0	0	0	
Cadmium	102	4	7/8	246.9	CASD-3	0	0	0	0	
Calcium+	NE	NE	8/8	965 - 272,000	CASD-2	NE	NE	0	0	
Chromium <sup>8</sup>	613	24	5/8	127 - 126	CASD-3	0	0	0	0	
Cobalt	4,088	156	8/8	1.7 - 15	CASD-3	0	0	0	0	
Copper	8,76	313	8/8	3.9 - 669	CASD-3	0	0	0	0	
Cyanide	4,088	156	4/8	0.66K - 2.53	CASD-1	0	0	0	0	
Iron	6,320	2346	8/8	4420 - 59,240	CASD-3	0	0	0	0	
Lead	400	400	7/8	151 - 180	CASD-1	0	0	0	0	
Magnesium+	NE	NE	8/8	855 - 5,710	CASD-3	NE	NE	0	0	
Manganese	28,616	1,095	8/8	55.4J - 369	CASD-3	0	0	0	0	

**ORDER NO.: G25**  
**CONTRACT ID. NO.: C00061322C02**

**APPENDIX A-6**

**SUPPLEMENTAL SEDIMENT DATA AND SUMMARY  
 CAMP ALLEN LANDFILL AREA B  
 NAVAL STATION NORFOLK, VIRGINIA**

Contaminant <sup>(1)</sup>	Sediment Criteria <sup>(2)</sup>			Contaminant Frequency/Range <sup>(3)</sup>			Comparison to Criteria		
	Region III Industrial Soil COC Value	Region III Residential Soil COC Value	No. of Positive Detections/No. of Samples	Range of Positive Detections	Location of Maximum Detection	Industrial Value	Above Residential Value	Positive Detects Above Residential Value	
<b>Inorganics (mg/kg):</b>									
Mercury	0	0	6/8	0.19L - 2.4L	CASD-3	NE	NE	NE	
Nickel	4,088	156	7/8	5.9 - 66.4	CASD-3	0	0	0	
Potassium+	NE	NE	7/8	392 - 2,490	CASD-1D	NE	NE	NE	
Selenium	1,022	39	4/8	0.93B - 4.1B	CASD-1	0	0	0	
Silver	1,022	39	3/8	2.1 - 35.1	CASD-3	0	0	0	
Sodium+	NE	NE	8/8	56.9 - 2,440J	CASD-2	NE	NE	NE	
Titanium	1431	1431	4/8	18.3 - 153	CASD-3	0	0	0	
Zinc	61,320	2,346	8/8	18.2 - 1,880	CASD-3	0	0	0	

**Soil/Sediment Notes:**

<sup>1</sup> Organic concentrations reported in µg/kg; inorganic concentrations reported in mg/kg.

<sup>2</sup> COC = USEPA Region III COC screening values derived from USEPA Region III Risk Based Concentration Table, dated May 2001.

<sup>3</sup> B = Analyte was detected in laboratory method blank

J = Analyte was positively identified, value is estimated.

K = Estimated value; biased high.

L = Estimated value; biased low.

M = Analyte was not detected

NA = Not Applicable

NE = Not Established

<sup>4</sup> Naphthalene COPC screening level used as a surrogate.

<sup>5</sup> Chlordane COPC screening level used as a surrogate.

<sup>6</sup> Endosulfan COPC screening level used as a surrogate.

<sup>7</sup> COPC screening level is for carcinogenic arsenic.

<sup>8</sup> COPC screening level is for chromium VI.

**ORDER NO.: G25**  
**CONTRACT ID. NO.: C00061322C02**

**APPENDIX A 1-6**

**Soil/Sediment Notes Continued:**

<sup>9</sup> Soil screening level for residential land use (USEPA, 1994b).

<sup>10</sup> COPC screening level is for thallium carbonate, thallium chloride and thallium sulfate.

<sup>11</sup> Lead retained for qualitative evaluation since no toxicity criteria are established.

<sup>12</sup> RBS is for mixture of cis- and trans- isomers

<sup>13</sup> Technical BHC used as surrogate.

<sup>14</sup> Pyrene COPC screening level used as a surrogate.

<sup>15</sup> Methanol COPC screening level used as a surrogate.

<sup>16</sup> beta-BHC COPC screening level used as a surrogate.

<sup>17</sup> Endrin COPC screening level used as a surrogate..

<sup>18</sup> Acenaphthene COPC screening level used as a surrogate.

**ORDER NO.: G25**  
**CONTRACT ID. NO.: C00061322C02**

APPENDIX A-7a

**1997 GROUNDWATER DATA SUMMARY  
 CAMP ALLEN SALVAGE YARD  
 NAVAL STATION NORFOLK, VIRGINIA**

Contaminant <sup>(1)</sup>	National Recommended Water Quality Criteria for Human Health Consumption of: <sup>(2)</sup>		Contaminant Frequency/Range <sup>(3)</sup>			Comparison to Criteria		
	Water + organism (ug/L)	Organism only (ug/L)	No. of Positive Detects/No. of Samples	Range of Positive Detections	Location of Maximum Detection	Above Water + Organism Value	Positive Detects Above Organism Only Value	Positive Detects Above Value
Volatiles (ug/l)								
1,1-Dichloroethane	3	190	1/71	10	NBS01-B-MW19B	0	0	0
1,1-Dichloroethylene	0.057	5	1/71	3.55	NBS01-B-EWA	0	0	0
1,2-Dichloroethane	5	90.0	1/71	4.7	NBS01-B-MW28	0	0	0
Benzene	5.4	60.0	5/71	210	NBS01-A-MW21	0	0	0
Chlorobenzene	680	21,000	10/71	3.9	NBS01-A-MW21	0	0	0
Chloroform	6	470	3/71	3.3	NBS01-B-MW11A	0	0	0
Tetrachloroethylene	55	340	3/71	2.5	NBS01-B-EWA	0	0	0
Trichloroethylene	5	600	1/71	3	NBS01-A-MW16	0	0	0
Vinyl Chloride	2.0	20	1/71	2.96	NBS01-A-MW16	0	0	0
Xylenes	10,000 <sup>(4)</sup>	3,000,000 <sup>(4)</sup>	1/71	3	NBS01-B-MW11A	0	0	0

## APPENDIX A-7b

**1998 GROUNDWATER DATA SUMMARY  
CAMP ALLEN SALVAGE YARD  
NAVAL STATION NORFOLK, VIRGINIA**

**ORDER NO.: G25  
CONTRACT ID. NO.: C00061322C02**

Contaminant <sup>(1)</sup>	National Recommended Water Quality Criteria for Human Health Consumption of <sup>(2)</sup>		Contaminant Frequency/Range <sup>(3)</sup>			Comparison to Criteria		
	Water + organism (ug/L)	Organism only (ug/l)	No. of Positive Detections/No. of Samples	Range of Positive Detections	Location of Maximum Detection	Above Water + Organism Value	Positive Detects Above Organism Only Value	Positive Detects Above Organism + Value
Volatiles (ug/l)								
1,1-Dichloroethane	5	190	1/19	1	NBS01-A-MW29	0	0	0
1,2-Dichloroethene (cis)	70 <sup>(4)</sup>	15,000 <sup>(4)</sup>	1/19	1	NBS01-A-MW29	0	0	0
1,2-Dichloropropane	1	39	1/19	1	NBS01-A-MW30B	0	0	0
Chlorobenzene	680	21,000	1/19	1	NBS01-A-MW29	0	0	0
Chloroform	6	470	1/19	2	NBS01-A-MW31B	0	0	0
Methyl Bromide	48	4,000	1/19	1	NBS01-A-MW15B	0	0	0
Methyl Chloride	NE	NE	1/19	99	NBS01-A-MW15B	0	0	0
Tetrachloroethylene	5	340	2/19	1	NBS01-A-MW15B, NBS01-A-MW16B	0	0	0
Trichloroethylene	1600	1600	1/19	1	NBS01-A-MW29	0	0	0
Vinyl Chloride	2 <sup>(4)</sup>	9 <sup>(4)</sup>	1/19	1	NBS01-A-MW19B	0	0	0

**ORDER NO.: G25**  
**CONTRACT ID. NO.: C00061322C02**

APPENDIX A-7c

**2001 MONITORING WELL GROUNDWATER DATA SUMMARY**  
**CAMP ALLEN SALVAGE YARD**  
**NAVAL STATION NORFOLK, VIRGINIA**

Contaminant <sup>(1)</sup>	National Recommended Water Quality Criteria for Human Health Consumption of: <sup>(2)</sup>		Contaminant Frequency/Rang <sup>(3)</sup>			Comparison to Criteria	
	Water + organism <sup>(4)</sup> ( $\mu\text{g/L}$ )	Organism only ( $\mu\text{g/L}$ )	No. of Positive Detects/No. of Samples	Range of Positive Detections	Location of Maximum Detection	Positive Detects Above Water + Organism Value	Positive Detects Above Organism Only Value
Volatile (ug/l)	200 <sup>(4)</sup>	13,500 <sup>(4)</sup>	4/83	15 - 210	NBS01-B-EW4A-01	0	0
1,1,1-Trichloroethane	200 <sup>(4)</sup>	0	1/83	1-1	NBS01-A1-MW21-R03	1	0
1,1,2,2-Tetrachloroethane	0	1/1	1/83	1-1	NBS01-B-MW19B-R03	1	0
1,1,2-Trichloroethane	200 <sup>(4)</sup>	42	1/83	1-1	NBS01-B-EW4A-01	1	0
1,1-Dichloroethane	5	190	4/83	10-11	NBS01-B-EW4A-01	14	0
1,1-Dichloroethylene	0	0	7/83	1-110	NBS01-B-EW4A-01	17	3
1,2-Dichlorobenzene	2,700	17,000	5/83	1-22	NBS01-A1-EW1A-01	0	0
1,2-Dichloroethane	200 <sup>(4)</sup>	190 <sup>(4)</sup>	8/83	2-230	NBS01-B-EW3B-01/NBS01-B-EW4A-01	8	22
1,2-Dichloroethylene (Gas)	270,000 <sup>(4)</sup>	15,000 <sup>(4)</sup>	11/83	1-1500	NBS01-B-EW4A-01	1345	0
Benzene	5	600 <sup>(4)</sup>	2/83	1-190	NBS01-B-EW4A-01	175	0
Chlorobenzene	680	21,000	9/83	1-1	NBS01-B-EW3A-01	0	0
Chloroform	6	470	1/83	1-1	NBS01-B-MW11B-R03	0	0
Ethybenzene	700 <sup>(4)</sup>	150,000 <sup>(4)</sup>	1/83	1-8	NBS01-B-MW23A-R03	0	0
Tetrachloroethylene	5	340	5/83	1-13	NBS01-B-MW33A-R03	3	0
Toluene	1,000 <sup>(4)</sup>	301,000 <sup>(4)</sup>	6/83	1-8	NBS01-B-MW11A-R03	0	0
Trichloroethylene	5	100	5/83	1-1	NBS01-B-EW4A-01	5	1
Vinyl Chloride	0	9	7/83	1-260	NBS01-B-EW3A-01	7	6

## APPENDIX B-1

**SURFACE SOIL DATA SUMMARY  
CAMP ALLEN SALVAGE YARD  
NAVAL STATION NORFOLK, VIRGINIA**

**ORDER NO.: G25  
CONTRACT ID. NO.: C00061322C02**

Contaminant <sup>(1)</sup>	Soil Criteria <sup>(2)</sup>			Contaminant Frequency/Range <sup>(3)</sup>			Comparison to Criteria		
	Region III Industrial COC Value	Region III Residential COC Value	No. of Positive Detections/No. of Samples	Range of Positive Detections	Location of Maximum Detection	Positive Detections Above Industrial Value	Positive Detections Above Residential Value		
Volatile (ug/kg)									
1,1-Dichloroethane	1,839,600	70,393	1/22	7 J	SYD-SB-10S	0	0		
Acetone	20,440,000	782,143	12/22	15 - 64 B	CASB-10-00	0	0		
Methylene chloride	76,309	8,516	12/22	6 B - 12 B	SYD-SB-20S	0	0		
Tetrachloroethene	11,006	1,228	1/22	4 J	SYD-SB-19S	0	0		
Trichloroethene	52,029	5,807	2/22	10 J - 28	SYD-SB-19S	0	0		
Semi-volatiles (ug/kg)									
1,4-Dichlorobenzene	23,847	2,661	1/22	150 J	SYD-SB-10S	0	0		
2,4-Dimethylphenol	4,088,000	156,429	1/22	37 J	SYD-SB-10S	0	0		
Benz(a)anthracene	784	88	6/23	34 J - 160 J	2SB-04A	0	0		
Benz(a)pyrene	178	19	7/23	34 J - 180 J	2SB-04A	0	0		
Benz(b)fluoranthene	178	18	8/23	34 J - 180 J	2SB-04A	0	0		
Benz(g,h,i)perylene <sup>10</sup>	4,088,000	156,429	7/23	43 J - 160 J	2SB-04A	0	0		
Benz(k)fluoranthene	7,840	875	5/23	51 J - 110 J	2SB-04B, CASB-4-02, CASB-4-02,	0	0		
Bis(2 ethylhexyl)phthalate	40,880	4,562	13/23	42 J - 400	2SB-04A	0	0		
Butylbenzylphthalate	40,880,000	1,564,286	2/13	77 J - 84 J	2SB-04A	0	0		
Chrysene	78,400	8,750	8/23	36 J - 200 J	2SB-04A	0	0		
Dibenz(a,h)anthracene	178	18	7/23	34 J - 180 J	2SB-04A	0	0		
Di-n-butylphthalate	20,440,000	782,143	2/23	64 J - 150 J	2SB-19A	0	0		
Fluoranthene	8,176,000	31,28,571	8/23	45 J - 180 J	2SR-04A	0	0		

**ORDER NO.: G25**  
**CONTRACT ID. NO.: C00061322C02**

**APPENDIX B-1**

**SURFACE SOIL DATA SUMMARY  
 CAMP ALLEN SALVAGE YARD  
 NAVAL STATION NORFOLK, VIRGINIA**

Contaminant <sup>(1)</sup>	Soil Criteria <sup>(2)</sup>		Contaminant Frequency/Range <sup>(3)</sup>			Comparison to Criteria		
	Region III Industrial COC Value	Region III Residential COC Value	No. of Positive Detections/No. of Samples	Range of Positive Detections	Location of Maximum Detection	Positive Above Industrial Value	Positive Above Residential Value	
Semivolatiles (ug/kg)								
Indeno[1,2,3-cd]pyrene <sup>4</sup>	6,132,000	234,643	6/23	36 J - 140 J	SYD-SB-10S	0	0	
Phenanthrene <sup>4</sup>	6,132,000	234,643	8/23	38 J - 280 J	2SB-04A	0	0	
Pyrene						0	0	
Pesticides/PCBs (ug/kg)								
4,4'-DDD <sup>5</sup>	2,385	1,683	1/1	12/26	2,385	21,100	2,385	
4,4'-DDE <sup>5</sup>	2,385	1,683	1/1	12/26	4,715	630 J	4,715	
4,4'-DDT <sup>5</sup>	2,385	1,683	1/1	15/26	4,841	2,609	4,841	
alpha-Chlordane <sup>5</sup>	1,635	183	6/25	1,1 J - 7.9	2SB-16A	0	0	
Aroclor 1248 <sup>5</sup>	286,000	32	1/25	1,1 J - 7.9	2SB-04A	0	0	
Aroclor 1254 <sup>5</sup>	286,000	32	1/25	1,1 J - 7.9	2SB-04A	0	0	
Aroclor 1260 <sup>5</sup>	286,000	32	1/25	1,1 J - 7.9	2SB-04A	0	0	
Dieldrin <sup>5</sup>	36	36	1/25	1,1 J - 7.9	2SB-04A	0	0	
Endrin	61,320	2,346	2/25	1,1 J - 1.7 J	SYD-SB-15S	0	0	
Endrin aldehyde <sup>6</sup>	61,320	2,346	4/25	5.9 J - 8.7 J	CASB-1-00	0	0	
Endrin ketone <sup>6</sup>	61,320	2,346	3/25	1.9 J - 3.7 J	CASB-1-00	0	0	
gamma-Chlordane <sup>5</sup>	1,635	183	5/25	2,2 J - 5.4 J	2SB-14C	0	0	
Heptachlor epoxide	63	7	2/26	1.8 J - 1.8 J	CASB-3-00	0	0	
Inorganics (mg/kg)								
Aluminum	2,044,001	782	5/5	1,619 - 11,100	SMETAB-2	10	12	
Antimony	1,821	1,821	5/5	361/95	2SB165F	75	75	

## APPENDIX B-1

**SURFACE SOIL DATA SUMMARY  
CAMP ALLEN SALVAGE YARD  
NAVAL STATION NORFOLK, VIRGINIA**

**ORDER NO.: G25  
CONTRACT ID. NO.: C00061322C02**

Contaminant <sup>(1)</sup>	Soil Criteria <sup>(2)</sup>			Contaminant Frequency/Range <sup>(3)</sup>			Comparison to Criteria		
	Region III Industrial COC Value	Region III Residential COC Value	No. of Positive Detections/No. of Samples	Range of Positive Detections	Location of Maximum Detection	Above Industrial Value	Positive Detects Above Industrial Value	Résidentiel Value	Positive Detects Above Industrial Value
<b>Inorganics (mg/kg)</b>									
Arsenic	0.0382	0.043	89/193	0/7 - 300	2SB16P04A	0	0	189	0
Barium	14,308	548	57/57	5.3 - 467	2SB104A	0	0	0	0
Beryllium	409	16	40/56	0.08 - 0.66	SYD-SB-10S	0	0	0	0
Cadmium+	204	18	50/57	0.17 - 44.9	2SB-04A	0	0	6	0
Calcium+	NE	NE	57/57	213 - 317,000	CASB-7-00	0	0	0	0
Chromium	6.13	23	57/57	0.5 - 100	2SB-04A	0	0	10	0
Cobalt	4,088	156	57/57	0.61 J - 20.7 L	2SB-04A	0	0	0	0
Copper	8,176	313	56/57	0.56 - 5430	2SB073A	0	0	7	0
Cyanide	4,088	156	1/23	0.63	2SB-14C	0	0	0	0
Iron	61,320	2,346	195/93	21090 - 308,000	2SB16213	0	0	25	0
<b>Inorganics (mg/kg)</b>									
Lead	NE	NE	400	15/9	15/16200	2SB16P04A	0	0	59
Magnesium+	NE	NE	57/57	213 - 5,130	2SB-19A	0	0	0	0
Manganese+	4,088	156	57/57	40 - 683	2SB104A	0	0	16	0
Mercury	NE	NE	42/57	0.033 J - 3.6	2SB-04A	0	0	0	0
Nickel	4,088	156	57/57	1.2 - 145	2SB104A	0	0	0	0
Potassium+	NE	NE	57/57	162 J - 4,250	2SB-17A	0	0	0	0
Selenium	1,022	39	21/57	0.2 J - 2.6	2SB077A	0	0	0	0
Silver	1,022	39	41/57	0.27 B - 11.4	2SB075A	0	0	0	0
Sodium+	NE	NE	51/57	33.3 - 5,750	2SB104A	0	0	0	0

**ORDER NO.: G25**  
**CONTRACT ID. NO.: C00061322C02**

**APPENDIX B-1**

**SURFACE SOIL DATA SUMMARY  
 CAMP ALLEN SALVAGE YARD  
 NAVAL STATION NORFOLK, VIRGINIA**

Contaminant <sup>(1)</sup>	Soil Criteria <sup>(2)</sup>		Contaminant Frequency/Range <sup>(3)</sup>			Comparison to Criteria		
	Region III Industrial COC Value	Region III Residential COC Value	No. of Positive Detections/No. of Samples	Range of Positive Detections	Location of Maximum Detection	Positive Detections Above Industrial Value	Positive Detections Above Residential Value	
<b>Inorganics (mg/kg)</b>								
Antimony	1.0	1.0	1/1	1/1	2SB104B	1/1	1/1	
Chromium	1.0	1.0	1/1	1/1	2SB108A	1/1	1/1	
Lead	1.0	1.0	1/1	1/1	2SB162B	1/1	1/1	
Titanium	1.0	1.0	1/1	1/1	2SB162B	1/1	1/1	
Vanadium	1.0	1.0	1/1	1/1	2SB104A	1/1	1/1	
Zinc	161.20	2346	1/1	1/1	2SB07BA	1/1	1/1	

## APPENDIX B-2

**SUBSURFACE SOIL DATA SUMMARY  
CAMP ALLEN SALVAGE YARD  
NAVAL STATION NORFOLK, VIRGINIA**

**ORDER NO.: G25  
CONTRACT ID. NO.: C00061322C02**

Contaminant <sup>(1)</sup>	Soil Criteria <sup>(2)</sup>		Contaminant Frequency/Range <sup>(3)</sup>		Comparison to Criteria		
	Region III Industrial COC Residential COC Value	Region III Residential COC Value	No. of Positive Detections/No. of Samples	Range of Positive Detections	Location of Maximum Detection	Positive Detections Above Industrial Value	Above Residential Value
Volatileics (ug/kg)							
Acetone	20,440,000	782,143	11/24	15 - 72 J	CASB-02-02	0	0
Methylene chloride	76,309	8,516	9/20	6 B - 10 B	CASB-02-02	0	0
Semivolatileics (ug/kg)							
2-Methylnaphthalene	4,088,000	156,429	6/22	39 J - 4,200	2SB-03B	0	0
4-Methylphenol	1,022,000	39,107	1/21	43 J - 43 J	2SB-10A	0	0
Acenaphthene	12,264,000	469,286	6/47	50 J - 590 J	2SB-12A	0	0
Acenaphthylene <sup>9</sup>	12,264,000	469,286	1/24	96 J	2SB-12B	0	0
Anthracene	61,320,000	2,346,429	3/22	40 J - 560 J	2SB-12A	0	0
Benzo(a)anthracene	784	188	3/21	10 J - 840 J	2SB-12A	0	0
Benzo(a)pyrene <sup>11</sup>	84	19	3/21	190 J - 650 J	2SB-10A	0	0
Benzo(b)fluoranthene <sup>12</sup>	784	188	3/21	42 J - 421 J	2SB-12A	0	0
Benzo(e,h,i)perylene <sup>10</sup>	4,088,000	156,429	3/21	150 J - 390 J	2SB-12A	0	0
Benzo(k)fluoranthene	7,840	875	2/21	110 J - 110 J	2SB-04B, CASB-4-02, SYD-SB-10S	0	0
Bis(2-ethylhexyl)phthalate	40,880	4,562	5/24	41 B - 99 J	CASB-4-02	0	0
Butylbenzylphthalate	40,880,000	1,564,286	1/14	38 J	2SB-10A	0	0
Carbazole	28,616	3,194	2/22	74 J - 220 J	2SB-12A	0	0
Chrysene	78,400	8,750	3/21	220 J - 1,000 J	2SB-12A	0	0
Dibenz(a,h)anthracene <sup>13</sup>	817,600	31,286	4/24	39 J - 130 J	2SB-12A	0	0
Dibenzofuran					2SB-12A	0	0

APPENDIX B-2

SUBSURFACE SOIL DATA SUMMARY  
CAMP ALLEN SALVAGE YARD  
NAVAL STATION NORFOLK, VIRGINIA

ORDER NO.: G25  
CONTRACT ID. NO.: C00061322C02

Contaminant <sup>(1)</sup>	Soil Criteria <sup>(2)</sup>			Contaminant Frequency/Range <sup>(3)</sup>			Comparison to Criteria		
	Region III Industrial COC Value	Region III Residential COC Value	No. of Positive Detections/No. of Samples	Range of Positive Detections	Location of Maximum Detection	Positive Detections Above Industrial Value	Above Residential Value		
Semivolatiles (ug/kg)									
Di-n-butylphthalate	20,440,000	782,143	3/24	65 J - 140 J	2SB-10C	0	0		
Fluoranthene	8,176,000	312,857	5/21	43 J - 1,700 J	2SB-12A	0	0		
Fluorene	8,176,000	312,857	6/24	57 J - 980 J	2SB-12A	0	0		
Indeno[1,2,3- <i>cd</i> ]pyrene <sup>4</sup>	784	88	1/21	100 J - 370 J	2SB-12A	0	0		
Naphthalene	4,088,000	156,429	5/22	50 J - 200 J	2SB-03A	0	0		
Phenanthrene <sup>4</sup>	6,132,000	234,643	2/20	220 J - 640	2SB-03A	0	0		
Pyrene	6,132,000	234,643	7/20	35 J - 430	2SB-03A	0	0		
Pesticides/PCBs (ug/kg)									
4,4'-DDD	2,385	266	4/24	10 NJ - 31 NJ	2SB-03A	0	0		
4,4'-DDE	1,683	188	7/24	1.7 J - 90 NJ	2SB-03A	0	0		
4,4'-DDT	1,683	188	3/23	2.5 J - 31 J	2SB-03A	0	0		
Aroclor-1260									
Dieldrin	36	4	1/23	1.4 J	2SB-10A	0	0		
Heptachlor epoxide	63	7	3/24	1.4 J - 3.6 J	2SB-12A	0	0		
Inorganics (mg/kg)									
Aluminum	32,044,001	7,821	63/66	17,600	2SB-20B	0	0		
Antimony	1,038,273	0.043	62/124	1021 B - 3,531 B	2SB200C	0	0		
Arsenic	14,308	548	125/127	0.37 BJ - 63.7	2SB204B	0	0		
Barium	409	16	45/63	0.14 - 0.93	2SB208B	0	0		
Beryllium									
Cadmium	204	8	53/66	0.11 J - 2.96	2SB-10B	0	0		
Calcium+	NE	NE	65/66	292 J - 473,000	2SB108B	0	0		

## APPENDIX B-2

**SUBSURFACE SOIL DATA SUMMARY  
CAMP ALLEN SALVAGE YARD  
NAVAL STATION NORFOLK, VIRGINIA**

**ORDER NO.: G25  
CONTRACT ID. NO.: C00061322C02**

Contaminant <sup>(1)</sup>	Soil Criteria <sup>(2)</sup>			Contaminant Frequency/Range <sup>(3)</sup>			Comparison to Criteria		
	Region III Industrial COC Residential Value	Region III Residential COC Value	No. of Positive Detections/No. of Samples	Range of Positive Detections	Location of Maximum Detection	Positive Detects Above Industrial Value	Positive Detects Above Residential Value	Positive Detects Above Industrial Value	Positive Detects Above Residential Value
Inorganics (mg/kg)									
Chromium <sup>+</sup>	613	23	66/66	118 - 124	2SB-10B	0	0	0	0
Cobalt	4,088	156	59/66	0.28 B - 19.2	2SB204B	0	0	0	0
Copper	1,703	231	62/66	10.52 B - 95.80 A	2SB-03A	0	0	0	0
Iron	61,320	2,346	127/127	188.6 - 189.000	2SB204B	12	12	12	18
Lead <sup>+</sup>	1,400	100	57/127	0.022 - 5.300	2SB204B	0	0	0	25.2
Magnesium <sup>+</sup>	NE	NE	62/66	25.5 - 4.430	2SB-10A	0	0	0	0
Manganese <sup>+</sup>	1,083	36	56/66	19.25 - 83.76	2SB204B	0	0	0	18.7
Mercury	NE	NE	40/66	0.017 B - 1.1	2SB072A,	0	0	0	0
Nickel <sup>+</sup>	1,080	36	63/66	0.835 B - 20.91	2SB-203	0	0	0	2.2
Potassium <sup>+</sup>	NE	NE	53/66	82.4 B - 3,940 L	2SB-10A	0	0	0	0
Selenium	1,022	39	19/66	0.19 J - 1.3 B	CASB-8-00, METAL4, METAL5D	0	0	0	0
Silver	1,022	39	36/66	0.17 B - 8.7	2SB207B	0	0	0	0
Sodium <sup>+</sup>	NE	NE	59/63	32 B - 4730	2SB207B	0	0	0	0
Thallium	NE	NE	29/63	0.6 B - 2.1	2SB106B	0	0	0	18
Vanadium	1,437	14	55/66	0.66 B - 6.2	2SB106B	0	0	0	18
Zinc <sup>+</sup>	6,1320	2,346	53/66	12.2 B - 189.000	2SB204B	0	0	0	25.2
Other	0	0			2SB-10B	0	0	0	0
Diesel Fuel (mg/kg)	NE	NE	2/3	150 J - 290 J	2SB-03B	0	0	0	0

**ORDER NO.: G25**  
**CONTRACT ID. NO.: C00061322C02**

**APPENDIX B-2**

**SUBSURFACE SOIL DATA SUMMARY  
 CAMP ALLEN SALVAGE YARD  
 NAVAL STATION NORFOLK, VIRGINIA**

Contaminant <sup>(1)</sup>	Soil Criteria <sup>(2)</sup>			Contaminant Frequency/Range <sup>(3)</sup>			Comparison to Criteria		
	Region III Industrial COC Value	Region III Residential COC Value	No. of Positive Detections/No. of Samples	Range of Positive Detections	Location of Maximum Detection	Above Industrial Value	Above Residential Value	Positive Detects Positive Detects	
Other									
Gasoline (ug/kg)	NE	NE	3/3	32 J - 19,000 J	2SB-03B	0	0		
Motor Oil (mp/kg)	NE	NE	3/3	550 J - 2,800 J	2SB-03A	0	0		

**ORDER NO.: G25**  
**CONTRACT ID. NO.: C00061322C02**

APPENDIX B-3

**SUPPLEMENTAL SURFACE SOIL DATA SUMMARY**  
**CAMP ALLEN SALVAGE YARD**  
**NAVAL STATION NORFOLK, VIRGINIA**

Contaminant <sup>(1)</sup>	Soil Criteria <sup>(2)</sup>		Contaminant Frequency/Range <sup>(3)</sup>			Comparison to Criteria		
	Region III Industrial COC Value	Region III Residential COC Value	No. of Positive Detections/No. of Samples	Range of Positive Detections	Location of Maximum Detection	Positive Detections Above Industrial Value	Positive Detections Above Residential Value	
<b>Inorganics (mg/kg)</b>								
Aluminum	2,044,001	7,821	5/5	5/5 - 11,100	Metal 12	0	0	1,175
Antimony	823	3	2/5	1B - 53 B	Metal 5	0	0	1,175
Arsenic	0,400	0,043	5/5	0,75 B - 55 S	Metal 3	0	0	1,175
Barium	14,308	548	5/5	15.8 B - 54.4	Metal 5	0	0	0
Beryllium	409	16	4/5	0,12 B - 0,2 B	Metal 5	0	0	0
Cadmium	102	1	4/5	0,24 B - 62	Metal 5	0	0	0
Calcium+	NE	NE	5/5	626 - 51,600	Metal 3	0	0	0
Chromium <sup>7</sup>	613	24	5/5	5 - 12	Metal 2	0	0	0
Cobalt	4,088	156	5/5	0,61 B - 1.9 B	Metal 2	0	0	0
Copper	8,176	313	5/5	2.3 B - 152	Metal 5	0	0	0
Iron	61,320	346	5/5	2,090 - 6,230	Metal 5	0	0	0
Lead <sup>8</sup>	400	400	5/5	3.1 - 83.3	Metal 15	0	0	0
Magnesium+	NE	NE	5/5	242 B - 974	Metal 3	0	0	0
Manganese	28,616	1,095	5/5	4.6 L - 67.9	Metal 15	0	0	0
Mercury	NE	NE	5/5	0,033 B - 0.82	Metal 5	0	0	0
Nickel	4,088	156	5/5	2.1 B - 8.6	Metal 15	0	0	0
Potassium+	NE	NE	5/5	162 B - 467 B	Metal 13	0	0	0
Selenium	1,022	39	2/5	1.1 - 1.3	Metal 4	0	0	0
Silver	1,022	39	1/5	0.42 B - 0.42 B	Metal 5	0	0	0
Sodium+	NE	NE	5/5	207 B - 740	Metal 13	0	0	0
Tellurium	14	14	3/5	0,69 B - 12	Metal 12	0	0	0
Vanadium	1,431	55	5/5	6.5 - 18.6	Metal 2	0	0	0
Zinc	61,320	2,346	5/5	5.1 - 194	Metal 5	0	0	0

**ORDER NO.: G25**  
**CONTRACT ID. NO.: C00061322C02**

APPENDIX B-4

**SUPPLEMENTAL SUBSURFACE SOIL DATA SUMMARY**  
**CAMP ALLEN SALVAGE YARD**  
**NAVAL STATION NORFOLK, VIRGINIA**

Contaminant <sup>(1)</sup>	Soil Criteria <sup>(2)</sup>			Contaminant Frequency/Range <sup>(3)</sup>			Comparison to Criteria		
	Region III Industrial COC Value	Region III Residential COC Value	No. of Positive Detects/No. of Samples	Range of Positive Detections	Location of Maximum Detection	Positive Detects Above Industrial Value	Positive Detects Above Residential Value	Positive Detects Metal 3D Value	Positive Detects Metal 5D Value
<b>Inorganics (mg/kg)</b>									
Aluminum <sup>4</sup>	2,044,001.44	17,181.14	6/6	1380 - 10,200	Metal 3D	0	0	0	0
Antimony	82	3	2/6	0.77 B - 1.1 B	Metal 5D	0	0	0	0
Arsenic <sup>5</sup>	10,400	10,055	6/6	0.67 - 1.77	Metal 3D	0	0	0	0
Barium	14,308	548	6/6	17.4 B - 99.2	Metal 5D	0	0	0	0
Beryllium	409	16	6/6	0.17 B - 0.49 B	Metal 5D	0	0	0	0
Cadmium	102	4	6/6	0.11 B - 0.65	Metal 3D	0	0	0	0
Calcium <sup>+</sup>	NE	NE	6/6	-	Metal 2D	0	0	0	0
Chromium <sup>7</sup>	613	24	6/6	5 - 14.8	Metal 3D-Dup	0	0	0	0
Cobalt	4,088	156	6/6	1.2 B - 2.6 B	Metal 3D-Dup	0	0	0	0
Copper	8,176	313	6/6	1.4 B - 13.1	Metal 5D	0	0	0	0
Iron <sup>8</sup>	1,120	234,000	6/6	1770 - 11,500	Metal 3D-Dup	0	0	0	0
Lead <sup>8</sup>	400	400	6/6	4.6 - 121	Metal 5D	0	0	0	0
Magnesium <sup>+</sup>	NE	NE	6/6	436 B - 2,390	Metal 3D-Dup	0	0	0	0
Manganese	28,616	1,095	6/6	94.3 - 193	Metal 5D	0	0	0	0
Mercury	NE	NE	6/6	0.021 B - 0.08 B	Metal 3D	0	0	0	0
Nickel	4,088	156	6/6	3.3 B - 5.6	Metal 5D	0	0	0	0
Potassium <sup>+</sup>	NE	NE	6/6	224 B - 655	Metal 3D-Dup	0	0	0	0
Selenium	1,022	39	2/6	1.2 - 1.3	Metal 5D	0	0	0	0
Silver	1,022	39	1/6	0.24 B - 0.24 B	Metal 1D	0	0	0	0
Sodium <sup>+</sup>	NE	NE	6/6	237 B - 2,650	Metal 2D	0	0	0	0

## APPENDIX B-4

**SUPPLEMENTAL SUBSURFACE SOIL DATA SUMMARY**  
**CAMP ALLEN SALVAGE YARD**  
**NAVAL STATION NORFOLK, VIRGINIA**

Contaminant <sup>(1)</sup>	Soil Criteria <sup>(2)</sup>			Contaminant Frequency/Range <sup>(3)</sup>			Comparison to Criteria		
	Region III Industrial COC Residential Value	Region III Residential COC Value	No. of Positive Detections/No. of Samples	Range of Positive Detections	Location of Maximum Detection	Positive Detects Above Industrial Value	Positive Detects Above Residential Value		
<b>Inorganics (mg/kg)</b>									
Thallium	14	1	1	3/6	0.6 B - 0.83 B	Metal 1D	0	0	0
Vanadium	1,431	55	6/6	8.2 - 29.3	Metal 2D	0	0	0	0
Zinc	61,320	2,346	6/6	11.8 - 47.3	Metal 5D	0	0	0	0

Notes:

<sup>1</sup> Organic concentrations reported in µg/kg; inorganic concentrations reported in mg/kg.<sup>2</sup> COC = USEPA Region III COC screening values derived from USEPA Region III Risk Based Concentration Table, dated May 2001.<sup>3</sup> B = Analyte was detected in laboratory method blank      + = Essential Nutrient

J = Analyte was positively identified, value is estimated.

K = Estimated value; biased high.

L = Estimated value; biased low.

4 COC screening value for pyrene used as a surrogate.

5 COC screening value for chlordane used as a surrogate.

6 COC screening value for endrin used as a surrogate

7 COC screening value for chromium VI

8 Action level for residential soils (USEPA, 1994b)

9 COC screening value for Acenaphthene used as surrogate.

10 COC screening value for Naphthalene used as surrogate.